The Rubber Age

Published Monthly at East Stroudsburg, Pa.
Editorial and Advertising Offices: 250 W. 57th St., New York

Vol. 42 JANUARY, 1938 No. 4

Some Newer Uses of Glycerine in Rubber

A Further Review of the Role Played by Glycerine in Rubber Compounding, Including Many New Developments

By Georgia Leffingwell, Ph.D. and Milton Lesser, B.Sc.

A RECENT review of the role of glycerine in the treatment and compounding of rubber and latex showed a wide diversity of applications of this versatile material (*1*). Examination of the latest literature, particularly patent literature, shows that the range of applicability of glycerine is far from being exhausted. Rather, it appears that the unusual physical and chemical properties of this clear, syrupy, hygroscopic fluid—glycerine—are finding new uses in almost every phase of the rubber industry.

Mercaptobenzothiazole is perhaps the best accelerator available for the vulcanization of rubber. Its fine aging, flat curing and abrasion resistance properties are somewhat offset by its lack of tensile strength, modulus and resilience (*2*). Any substance which can remedy these faults is therefore of interest to rubber chemists. A study of the effects of synthetic higher alcohols on the rate of vulcanization of mercapto-accelerated tread stock (*3*) suggested to Wiegand that any further studies should include glycerine (*4*). This investigator felt that glycerine might be advantageous, "not only because of its availability and cheapness, but also because of its natural occurrence in many crude fatty acids which, from time to time, find their way into rubber compounds." It was also hoped that its trihydroxy structure, though increasing its reactivity per unit weight, might as a consequence counteract the acidity present in the accelerator and in tarry softeners and so improve the curing conditions.

The results of his preliminary tests were so encouraging that Wiegand worked further, and thoroughly confirmed his earlier findings. He is of the opinion that the glycerine serves as a "buffer to the acidity either of the mercapto-accelerator or of the pine tar softener, or both." This improved the physical properties by eliminating, at least in part, the retarding effect of the "acidity" but without in any way interfering with the mechanism of acceleration and cure. An addition of as little as one-eighth per cent of glycerine showed marked effects. The optimal addition was three-quarters per cent. Wiegand tried a mercapto-accelerated factory batch which was exactly the same as usual, except for the substitution of one-half per cent of glycerine for the same amount of tar. Definite improvements were noted.

Wiegand concluded that: "A precooked mixture of one part of glycerine with three parts of medium pine tar improved the rate of cure, modulus and tensile strength of a mercapto tread stock containing 50 per cent of carbon black." He stated further: "Judging

Soap solutions, which are used as mold lubricants, can be made far more efficient by the incorporation of glycerine.

from an examination of raw stock both when fresh and after eight months storage, there would seem to be a likelihood that a reaction product of glycerine and pine tar in suitable proportions might be a softening agent for rubber worthy of consideration."

While on the subject of treads, any anti- or non-slip rubber material for tires should be of interest. This non-slip rubber is made by mixing a powdered, hard mineral substance like quartz with glycerine and a heavy metal oxide (such as lead oxide) to form a paste. Ten to thirty per cent of this paste is added to the rubber. The glycerine and oxide coating on the particles bonds them to the rubber and prevents their migration into the body of the tire *(5)*. Of a similar nature but for use on such articles as rubber shoes, and the like, is the method for surfacing rubber objects with finely crushed or pulverized materials. Here a rubber coagulating solution containing zinc chloride and glycerine, upon which the comminuted material has been deposited, is spread with coagulable rubber. The resulting layered product is removed from the support and is ready for further treatment *(6)*.

Garner *(7)* feels that mold lubricants for rubber have not received the scientific evaluation and study that their importance warrants. French chalk (talc) is a good lubricant, but has a tendency to dirty the molds quickly. Dilute soap solutions, he indicates, are preferable, but the solutions must be quite neutral. These soap solutions can be brought closer to the optimal pH and made more efficient, particularly when the rubber being treated is very hot, by incorporating glycerine. The addition of glycerine likewise helps prevent sticking *(8)*. Bennett gives a formula for a preparation, consisting of glycerine five parts and alcohol ninety-five parts, to prevent rubber from clinging to embossing rolls *(9)*.

The problem of creating an oil-resistant rubber has been partly solved by the new rubber-like synthetics. But the problem must be solved for rubber itself. "Many attempts to prepare an oil-resistant rubber by variations in the compounding ingredients have had only limited success," says W. F. Busse in a recently published rubber symposium *(10-a)*. Continuing: "The easiest method of obtaining an oil-proof 'rubber' is to obtain a flexible substance, the molecules of which have much less attraction for oil than for one another. One of the most common examples of this type of substance is a glue-glycerol gel. This has long been used for printers' rolls because of its oil resistance." In this connection the following rubber compound should be of value. A mixture formed of a concentrated aqueous dispersion of rubber, 1 part, a gelatinous substance (e.g. gelatin) 1 part, and 2 parts of glycerine is coagulated and vulcanized. This preparation is used to make printing rollers *(11)*.

Oil-Resistant Rubber Compounds

A rubber compound which is claimed to be oil resistant has been prepared by mixing with rubber an aqueous extract of chondrus (a sea weed) and glycerine. The usual rubber compounding ingredients, such as sulfur, accelerator, age retarder, filling material and drying oil, are likewise added *(12)*.

The value of glycerine as a suppling agent for rubber has long been known. With the growing use of extruded rubber and latex threads, glycerine has found application for a like purpose. One patent recommends that glycerine be incorporated in latex thread coatings to render these filaments pliant *(13)*. The same inventor advocates the inclusion of glycerine in threads made from rubber dispersions containing viscose or cellulose in order to prevent brittleness when dry *(14)*. Similarly, the accumulation of electrostatic charges on rubber threads which form fire and explosion hazards, are prevented by treating the threads with a solution containing a salt and glycerine *(15)*. The same type of application should prove of value in other types of rubber treatment where friction and stress may produce dangerous static electricity.

The manufacture and use of rubber and latex-covered or impregnated materials requires that they be flexible without becoming brittle. Here glycerine, because of its hygroscopic nature, has found wide suitableness. Gerke produced a flexible hardened slip finish on rubber surfaces, such as those on rubberized fabrics, by treating the surface for a short period of time with a mixture of concentrated sulfuric acid (5 parts) and glycerine (15 parts) *(16)*. This invention was listed among the important advances in rubber technology in the United States during 1936 *(17)*. It was found that the gas impermeability and tear resist-

Glycerine finds numerous applications in the mixing and milling of rubber, making it more supple and flexible.

ance of goods of or containing rubber deposited directly from aqueous dispersions, are improved by diffusing glycerine into the deposited rubber *(18)*. A compound for coating artificial leathers by mixing an emulsion of toluene and an aqueous glue solution with latex and glycerine is described by Schur *(19)*. Schur also patented a material for use in making shoe upper stock which is impregnated and strengthened with rubber latex solids. With this was incorporated throughout, enough glycerine to neutralize the stiffness in the base produced by the latex solids *(20)*.

In recent years the important glycerine resins, the "glyptals" (also known as alkyd resins) have received marked attention from rubber chemists. A word about the chemistry of these resins is therefore in order. Glyptal resins are condensation products of glycerine and phthalic anhydride or acid. Their properties may be modified or adjusted to suit a wide range of needs by the incorporation of a third ingredient or group of ingredients *(21)*. The literature is replete with references to the growing number of uses for these versatile glyptal resins. Although glycerine is said to have no effect on the scorching propensities of rubber, the addition of 1 to 2 per cent of glyceryl phthalate is recommended to prevent scorching during the milling of rubber *(9)*.

The porosity of a chlorinated microporous film which is suitable as a filter, diffusion membrane or ultra-filter, may be controlled by the addition of non-volatile glycerol-phthalic acid resin to the rubber solutions that are to be worked up. Such films may be used as coatings on dollies of dry cells to replace the usual fabric casing. These films, with slight modifications may also be used as diaphragms for electrolysis, as electrodes, and for coating fabrics *(22)*. The greater use of these resins, however, is in the prevention of diffusion by the formation of water and gas impermeable coatings.

Glycerine in Coating Materials

Twiss and his associates have improved the gas retaining properties of heat vulcanized rubber by applying to it a composition containing a glyptal resin and a synthetic sulfur-containing thermoplastic material. Two methods for preparing these coatings are described, starting from the raw materials and going through the entire process *(23)*. A German gas proofing patent is very similar. Warm vulcanized rubber objects are coated with a mixture containing a large proportion of alkyd resins *(24)*. In both of these patents these coatings may be supercoated with solutions of rubber or synthetic rubber. Russian investigators have perfected lacquers for coating rubber galoshes. These materials are essentially glyptal resins, modified with raw linseed oil and lead oxide *(25)*.

The disintegration or aging of rubber when it is exposed to oil and other substances causing breakdown is commonplace and often the despair of rubber products manufacturers. Rubber can be kept from contact with oil by the employment of these glyptal resins in the form of coatings or lacquers. Glyptal resins may be used in hose or oil line gaskets. Because of their high oil resistance these resins have also been used in printing rollers *(10-a)*. They can be made as flexible as rubber *(10-b)*.

For economic and political reasons associated with national sufficiency in times of war as well as peace, synthetic rubbers are the subject of wide study. Here will be found employment for glycerine in the form of resins, as softening agents, as dispersing media, and the like. Carothers and his co-workers polymerized chloroprene in the presence of film-forming material,

Rubber tubing is often given a glycerine-alcohol bath by rubbing it over with a dampened sponge as indicated here.

such as natural or synthetic resins. Particular emphasis was on the glyptal resins and on chinawood oil *(26)*. A soft, rubbery material produced as a condensation product of glycerine and adipic or sebacic acid has received attention for its interesting properties. When compounded with nitrocellulose or other cellulose esters, this material forms preparations of good flexibility, toughness and elasticity, and on hardening is insoluble in most of the common solvents *(27)*. Glycerine also enters into many glue compositions which have been used as rubber substitutes. Glycerine is employed as dispersing agent for fatty acids used in the manufacture of rubber-like materials *(28)*. It is similarly used in diffusing alkalis. In the manufacture of "Gralax", a mixture of synthetic rubbers on special fibres, a coating containing glycerine among other ingredients is employed. This material finds use as a substitute for soft leather *(29)*.

Glycerine, too, finds many valuable miscellaneous uses in connection with rubber. A sheeted material for separating layers of tacky rubber is made by coating cloth or paper with a solution of 140 parts of sodium silicate, 15 parts of glycerine and a small proportion of a wax emulsion *(30)*. Its use as a lubricant in places such as rubber mills where oil may not be used, is well known. In the manufacture of golf balls, one with a unique gas-containing core employs glycerine to keep the central mass plastic *(31)*. The value of glycerine to the rubber industry has only been indicated. No doubt, research workers will find newer applications for this interesting material and greatly enlarge the scope of its usefulness.

BIBLIOGRAPHY

(1) Leffingwell, G., *The Rubber Age*, **39**, 6, 338-40 (Sept., 1936).
(2) Jones, M., *India Rubber J.*, **92**, 18A, 30-32 (Nov. 4, 1936).
(3) Wiegand, W. B., *Can. Chem. & Met.*, **18**, 24 (1934).
(4) *Ibid*, **19**, 2-4 (1935).
(5) Luchinger, J. O., U. S. Pat., 2,011,496 (Aug. 13, 1935); Ger. Pat. 612,697 (May 2, 1935). (Cl. 39b, 5).
(6) Diller, A. L. and Hollier, L. H. L., U. S. Pat. 2,029,361 (Feb. 4, 1936).

(7) Garner, T. L., *Ind. Chemist*, **12**, 493-7 (Nov., 1936).
(8) Talalay, J. A., Brit. Pat., 443,096 (Feb. 13, 1936).
(9) Bennett, H., "The Chemical Formulary", Vol. 1, Chem. Pub. Co., N. Y. C. (1934).
(10-a) Davis, C. C. and Blake, J. T., "The Chemistry & Technology of Rubber", A.C.S. monograph, Reinhold Pub. Co., N. Y. C. (1937).
(10-b) *Gen. Electric Rev.*, Jan., 1937.
(11) Neubert, C., U. S. Pat., 2,004,508 (June 11, 1935).
(12) Minimoto, H., Jap. Pat. 113,934 (Jan. 10, 1936).
(13) Shepherd, T. L., French Pat. 804,800 (Nov. 2, 1936).
(14) Shepherd, T. L., Brit. Pat. 449,314 (June 18, 1936).
(15) James, R. G., Brit. Pat. 465,209 (May 4, 1937).
(16) Gerke, R. H., U. S. Pat. 2,057,717 (Oct. 2, 1936).
(17) Jones, W. N., "Annual Survey of American Rubber Chemistry for 1936", Carnegie Inst. of Techn., Pittsburgh, Pa. (1937).
(18) Internat. Latex Processes, Ltd., Brit. Pat., 426,402 (Apr. 3, 1935).
(19) Schur, M. O., U. S. Pat. 2,060,129 (Nov. 10, 1936).
(20) Schur, M. O., U. S. Pat. 2,033,486 (March 10, 1936).
(21) Lesser, M. A. and Leffingwell, G., *Modern Plastics*, May, 1937, p. 45.
(22) Brit. Pat. 442,727 (Feb. 10, 1936).
(23) Twiss, D. R., et al., Brit., Pat. 426,757 (April 9, 1935).
(24) Deutch. Dunlop Gummi-Com., A-G., Ger. Pat. 643,565 (Apr. 12, 1937). (Cl. 39b).
(25) Il'in, W., Surkova, O., and Bolatin, A., *J. Rub. Ind. (U.S.S.R.)*, No. 5, 60-1 (1937).
(26) Carothers, W. H., Collins, A. M., and Kirby, J. E., U. S. Pat. 2,029,410 (Feb. 4, 1936).
(27) U. S. Pat. 1,779,367 (Oct. 21, 1930).
(28) Int. Latex Processes, Ltd., Fr. Pat. 806,882 (Dec. 28, 1936).
(29) Grafov, E., *J. Rub. Ind. (U.S.S.R.)*, No. 11, 1158-63 (1936).
(30) Thompson, H. L., U. S. Pat., 2,017,499 (Oct. 15, 1935).
(31) Twiss, D. F. and Hughes, A. J., Brit. Pat., 453,185 (Sept. 7, 1936).

Ink Cleaner for Rollers

THE problem of properly removing quick-drying inks and varnishes from the surface of rubber and synthetic rubber rollers is said to be solved by the introduction of a new cleansing agent, called Afco Ink-Zip, by the Fergusson Laboratories, Drexel Building, Philadelphia, Penna. Quick-drying inks have a tendency not only to cake upon roller surfaces but also to become too sticky or tacky during long printing runs, this difficulty being due in part to the fact that rubber rollers have a greater affinity for high gloss varnish types of ink than regular composition rollers. Ordinary cleansing compounds were not found suitable because they required pressure and too much friction is injurious to any kind of inking roller.

The Afco Ink-Zip is said to have a slow evaporation characteristic, thus allowing the pressman a reasonable time for applying the fluid and keeping evaporation loss down to a minimum. It will not disintegrate or swell rubber or synthetic rubber rollers, according to its manufacturers, and will readily remove dried ink regardless of its age. Another use for the new cleanser is in removing dried ink images from the surface of rubber blanket cylinders on rotary offset presses. This cleaning includes dried impressions in high gloss ink, "non-scratch" ink, or any other type of quick-drying ink. The surface of the rubber blanket is left clean and smooth, ready for new offset work.

Afco Ink-Zip, which may be used for cleaning any of the various makes of composition rollers, ink distributing plates, and fountains, is the result of development work conducted by Gus A. Vasel, associated with both the Fergusson Laboratories and the Vulcan Proofing Company of Brooklyn, N. Y.

"Rubrmatic" Road Surfacing Material

THE search for a suitable road surfacing material made of or with rubber continues. Especially are experiments along this line progressing in England. Several sections of highway in various parts of the country have been laid with rubber paving bricks and with other forms of rubber and constant check on performance is maintained. One of the latest materials to make its appearance is known as "Rubrmatic" and a section of highway at Deptford has been successfully laid.

Rubrmatic is a development of A. E. H. Dussek. For a number of years Mr. Dussek has been experimenting with various forms of rubber to find a surfacing material that would set quickly and be open to traffic immediately, that would neither wave, creep nor bleed under heat, or crack in cold weather, and one that would be resilient, noiseless, not subject to deformation and present a non-skid surface when laid. His experiments included compositions of latex, crude rubber, and vulcanized rubber with asphalts of all kinds, since rubber alone did not give the required properties for a modern highway. Finding that rubber dissolved or melted in bitumen lost almost all of its elastic properties, Mr. Dussek attacked the problem by introducing powdered rubber into melted bitumen.

In the preparation of Rubrmatic, rubber in powder form is used and it is mixed with the bitumen and aggregate at the same temperature at which the bitumen is normally used. At this temperature the rubber does not melt but the particles are discharged throughout the mixture and retain their identity. In the Deptford experiment, the new surfacing material was laid to a thickness of 2 to 2½ inches, the same thickness at which hot asphaltic carpets are generally laid. The cost of the material is said to be slightly higher than that of ordinary asphalt surfacing materials.

Goodyear Airfoam Seat Cushions

CLAIMING several advantages over similar types of transportation upholstery, the Goodyear Tire and Rubber Company has introduced a line of seat cushions made of "Airfoam," a new product. Airfoam, unlike ordinary sponge rubber, is said to be treated in such a manner that it has absolutely no odor and is slightly antiseptic, repelling moths and vermin. Latex, which forms 95 per cent of the product, is beaten into a froth containing millions of interconnected air cells, which is subsequently cured in molds. In the case of seat cushions, the molds have been designed to fit the special needs of truck and bus seat manufacturers.

Airfoam cushions are said to be of much greater durability than the steel spring and padding upholstery type of cushioning product. They are dustless and do not exude lint in any form. Their porous nature insures comfortable temperature of the seats due to the fact that every movement of the body forces air to circulate throughout the entire structure of the seat. Under pressure, the air in the honeycombed rubber escapes and the seat adjusts to any body position, resuming its shape when the pressure is removed.

One special advantage claimed for Airfoam over other types of transportation upholstering is the fact that while steel springs transmit vibration Airfoam absorbs it, thus effecting a notable reduction in driving strain during long periods at the wheel. The new latex product has also been made available in mattress form suitable for sleeper cab accommodations.

Columbian Carbon Opens New Laboratory

Completely Equipped Laboratory in Brooklyn, New York, Contains the Newest of Testing Equipment and Apparatus

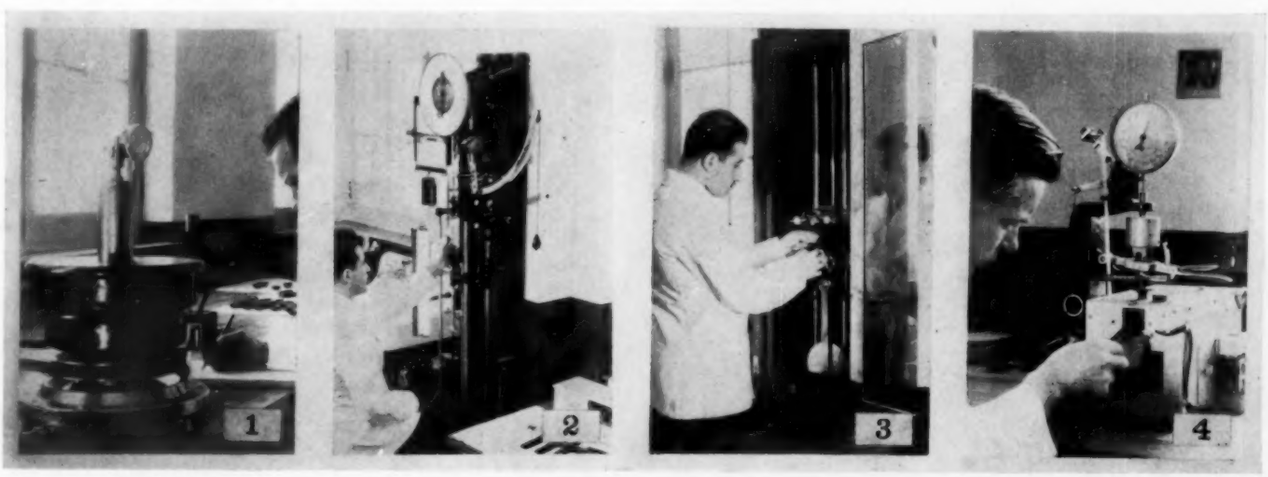
A COMPLETELY equipped research laboratory, containing the last word in testing equipment, was recently opened in Brooklyn, New York, by the Columbian Carbon Company, one of the leading producers of carbon black. Facilities have been provided in the new laboratory covering all the important applications of carbon including its use in the rubber, paint, ink and other fields. The laboratory occupies a four-story building at 214 Forty-fourth Street, modern in all particulars, with a total floor space of 11,880 square feet. The ground floor includes a museum and reception room, while the other three floors are devoted to laboratory and semi-plant scale equipment. In the museum may be seen an extensive assortment of colloidal carbon samples, which indicate the diversified grades required by industry, as well as a number of products in which they are used.

In the rubber testing section of the new laboratory there are a number of modern static testing machines, supplemented by an important and growing group of apparatus for dynamic testing. Among the static testing machines there are the Scott tester for determining tensile strength, elongation and modulus; the Goodrich plastometer, for measuring the deformation of cylindrical samples and also for scorching tests, and the latest type of T-50 test equipment, developed by the Naugatuck Chemical Division of U. S. Rubber Products, Inc., in conjunction with the Henry L. Scott Company, which is used to determine the degree of vulcanization obtained in cured rubber samples.

Included in the special apparatus for dynamic testing are three well-known types of abrasion machines, i.e., the U. S. Rubber, DuPont-Grasselli, and Goodyear angle abrader machines, each of which is used as a separate check against the other. There are also the Schopper elastometer and the Goodyear-Healey rebound pendulum machines, both of which are used for testing the rebound tendency of a stock; the Schopper detrition machine, which indicates the effect of internal heat generated within solid rubber ball samples when rotated under pressure; and a de Mattia flexing machine. Some of this special apparatus has been modified for greater convenience or accuracy of measurement. The Goodyear-Healey rebound pendulum has been improved by the addition of a mercury electric contact for reading rebound more accurately than can be done using pawls to hold the pendulum at the top of the swing. The de Mattia flexing machine is equipped to test samples in air or any desired gas under conditions of temperature, humidity, or composition variable at will.

Unique in the testing of rubber is a newly perfected machine, designed by the company's laboratory staff, for measuring stress and strain in rubber under any desired conditions of elongation and cyclic application of force. This machine gives the life and fatigue characteristics of rubber under conditions of dynamic stretch. Samples in the form of annular rings are stretched between two horizontal cylinders, arranged to rotate about their axes. One of these is connected to the crank of a motor-driven fly wheel and the other to a balanced pendulum so constructed as to be out of phase with the impulses of the crank and to indicate the average pull on the sample. Elongation of the sample can be varied at will and its fatigue characteristics determined under any desired conditions of elongation and high speed cyclic stroke.

Additional apparatus for the testing of rubber at the



1. Schopper detrition machine used to study the effects of rolling pressure on rubber samples. 2. Modulus, tensile, elongation and tear tests are made with this Scott tester. 3. The de Mattia flexing machine for testing life of rubber samples. 4. Effects of temperature on rubber samples are tested on the Goodrich plastometer.

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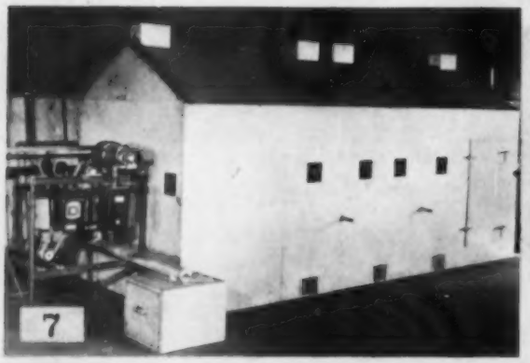

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5. Museum of products made with colloidal carbon maintained at the laboratory.

6. Flames impinging on the six-inch channel.

7. View of the miniature producing plant.

8. Two different lights are used in a dark room to check all colors exactly.

new laboratory includes three pH meters—of the Coleman, Leeds & Northrup and Beckman types—for the determination of hydrogen ion concentration in colloidal carbon.

pH Properties of Carbon

Special interest attaches to the studies made in this laboratory of the pH properties of carbons and their effect on uses of these products, both in rubber and in oily vehicles. The low pH carbons retard vulcanization of rubber and drying of paints and enamels. Low pH properties, together with their concomitant high combined oxygen values, also play an important constructive role in dispersion. Preliminary experiments carried out in these laboratories indicate that raising the pH of rubber carbons by means of heat treatment, while increasing the rate of vulcanization, may ultimately reach a point where dispersibility declines seriously.

Also, in the family of rubber carbons it is by no means those of the highest pH and the lowest volatile content which have given the best results in the reinforcement of rubber. Thus the central position of the family of rubber carbons in the classification may be looked upon as representing a compromise between high pH with diminished dispersibility on one hand, and high volatile content involving low pH and excessive retardation of cure, on the other.

If there be any merit in the hypothesis that the carbon reinforcement of rubber consists essentially in the formation of new physico-chemical complexes between individual macro-molecules of the rubber substance and layers of carbon particles surrounding them, it would seem probable that the C_xO_y complexes are essential to the bond between carbon and rubber, thus also implying a relationship between pH and reinforcement. In this view, and on the basis of a calculation of the oxygen required to form a monomolecular layer on the surface of a carbon particle of diameter 50 mu, the value for such oxygen content (3%) corresponds to a total volatile content of between 5 and 6%.

This calculation is, of course, subject to various errors but it invites the theoretical suggestion that the maximum reinforcement of rubber is not likely to occur if the combined oxygen content be depressed much below this level. Per contra, combined oxygen much higher than this value probably plays no useful role in the development of what may be termed the "reinforcement bond."

The role of fatty acids in the dispersion of carbon in rubber is now recognized as an important one. The higher the C_xO_y content (with progressively lower pH) the higher appears to be the dosage of fatty acid required to bring out the full reinforcing properties of the carbon. It would thus seem that the C_xO_y contribution to the carbon-rubber bond can reach its highest effectiveness only if the rubber units (macro-molecules) are, as it were, activated by the presence of long-chain polar bodies. Per contra, the optimum pH (or combined oxygen content) for a rubber carbon is in all likelihood influenced by the available content of fatty acid or its equivalent, in the mixing.

Complete equipment is provided in the laboratory for compounding, milling, calendering and vulcanizing rubber samples. Equipment includes a mixing mill, an internal mixer, a three-roll calender, and both hand and hydraulic four-platen presses. The hydraulic press is equipped with a table, adjustable by hydraulic power to the platen level for the removal of molds.

Every effort has been made in designing the rubber laboratory to conform to conditions found in the laboratories of the rubber manufacturers themselves.

A miniature producing plant, which closely duplicates the conditions found in the natural gas fields, is also part of the laboratory. This miniature plant measures 13 feet in length by 5½ feet in width by 6½ feet in height. It is equipped with four channels, each six inches wide. The effects of varying flames and of position of collecting channels with respect to them, and the many other variables in the carbon production problem can be studied under controlled conditions by means of this miniature plant. Special mica windows are provided in the plant for study purposes.

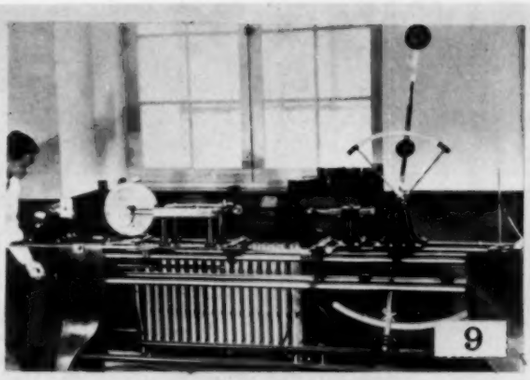
The use of white coats by research workers in the new laboratory dispels the popular belief that the use of carbon black must result in unsightly surroundings with resulting discomfort to the worker. Cleanliness in handling the black is achieved by special exhaust systems installed at points where dust is encountered. Even the experimental manufacture of colloidal carbon is carried out without the usual smoke and dust. All weighing out of batches of materials is conducted in a separate room with adequate ventilation which effectively prevents the spread of any dust.

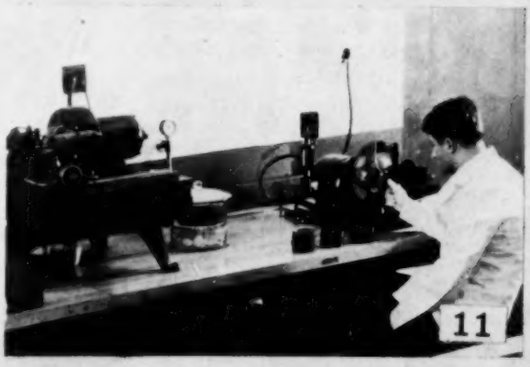
The primary purposes of the new laboratory are research on carbon and on consumers' problems. To this end Columbian Carbon has provided special facilities for conferences with interested industry groups on problems of mutual interest. Frequent seminar sessions with invited representatives of carbon consuming industries are planned to keep investigations close to the problems of the various industries. The first of these seminars was initiated in mid-November, when leading manufacturers of printing ink in the New York Metropolitan area participated in a round table discussion of problems pertinent to their industry with the research staff of the carbon laboratory. Seminars are being scheduled for the rubber, paint, plastics, paper and other industries in the early future.

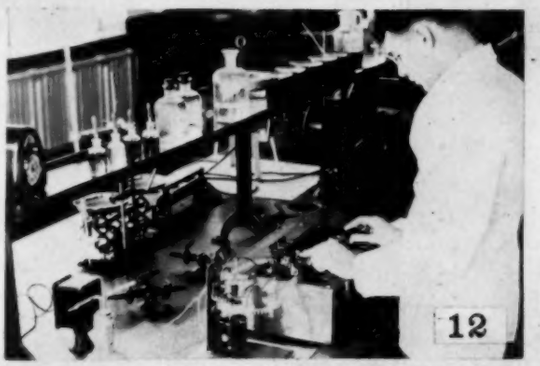
History of Columbian Carbon

The Columbian Carbon Company was organized in 1907 and expanded rapidly. Its current officers include F. F. Curtze, as president; R. L. Carr, as vice-president and secretary; and George L. Bubb, as treasurer. It now owns and operates 28 plants and produces the largest output of black pigments in the world. Since its very beginning, the Binney & Smith Company has exclusively handled its pigments. Columbian Carbon is also the largest producer of iron oxide pigments in the United States. In addition to colloidal carbon and iron oxide pigments, the company also produces natural gas, gasoline, lamp black, bone black, printers' ink, oil and other specialties. Its natural gas properties consist of 338,000 acres owned or leased in 12 states from which 688 natural gas wells yield an average of 60 billion cubic feet of gas annually. This gas is gathered through 695 miles of pipe lines in the field and part of it is supplied to Chicago, St. Louis, and other metropolitan centers.

Columbian Carbon's research facilities now include laboratories at Brooklyn, N. Y., Philadelphia, Penna., and Trenton, N. J., in addition to fellowships at the Mellon Institute at Pittsburgh, Penna. It also operates a lamp black research and control laboratory at Tacony, Penna. The new Brooklyn laboratory is known as the company's Central Research Laboratory. This laboratory and other associated technical activities are under the direct supervision of Dr. William B. Wiegand, assisted by H. A. Braendle.







9. Characteristics of rubber under stretching are determined on this tester.

10. Grasselli and U. S. Rubber abrasion machines.

11. U. S. Rubber and Goodyear abrasion machines.

12. Leeds and Northrup pH meter used to determine hydrogen ion concentrations.

Steel Surfaces for Rubber Adhesion

A SOLUTION consisting of copper cyanide (4 oz./gal.), zinc cyanide (2 oz./gal), and sodium cyanide (7 oz./gal.) serves excellently to provide a brass-plated surface on steel which will permit good adherence of rubber, according to an article in a recent issue of *Modern Metal Finishing*. Where especially strong adhesion is required, a slight increase should be made in the zinc cyanide concentration, according to the article, while for barrel plating the proportions should be doubled, just as in regular brass plating. Ten minutes is the recommended plating time.

The brass plating solution should be operated at a temperature of about 80° F, using 70-30 brass anodes and maintaining a cathode current density of approximately 10 amperes per square foot. Anode current density should not exceed 300 amperes per square foot. When the solution is made up, the alkalinity must be adjusted with ammonium hydroxide and sodium bisulfite so as to give the deposit the right color. A constant pH is important in obtaining a uniform deposit, the suitable range being 10.3 to 11.7, maintained by the usual colorimetric methods.

Special care must be taken in the rinsing to prevent staining. After plating, the work should be immediately painted with the cement used for rubber adhesion. Experience indicates, says the article, that the best rubber adhesion is obtained when the composition of the brass is 70% copper and 30% zinc. Even small changes, such as 3 to 5%, can reduce adhesion appreciably. Metal carbonates should not be used in brass plating for rubber adhesion. Large amounts of carbonates simply complicate control of the solution. Any savings effected by the use of carbonates is usually offset by poor results and difficulties in control.

Rubber in Relief Map Process

RUBBER is being utilized to advantage in the production of relief maps and pictorial copies in quantities by means of a recently perfected method and machine now used by Third Dimension Maps, Inc., a new organization with headquarters at Washington, D. C. The method and machine were perfected by John J. Braund, cartographer in the Coast and Geodetic Survey.

In the new method, the maps are made by bending a semi-soft aluminum sheet instead of building up the maps in lifts and applying lettering by pasting paper to the finished product. The map is printed on both sides of the aluminum sheet. The sheet is then locked in a machine known as the "reliefograph." A rubber base is placed beneath the sheet at the level of the lowest contour. This contour line is then driven down to the rubber base by means of a rubber-headed punch, the stroke of which is controlled by a special device. The base is then lowered one elevation, the stroke of the punch is changed, and the second elevation is depressed. The process is continued until the map is finished, with all markings in place.

Three dimensional duplicates are made by a special hydraulic press, or maps with a relief effect may be obtained by photographing the model under a slanting light. The company claims it is able to produce relief maps at about a fifth of the cost and about sixteen times as fast as any previous method.

Mayco Protective Coatings

A NEW line of protective coatings, containing chlorinated rubber with acid and alkali-resistant pigments and plasticizers, has been introduced by the May Products, Inc., 198 Niagara Street, Newark, N. J. The coatings have been offered for the effective protection of plant and equipment against corrosion. Various types of coatings have been made available by the company. All of them are described as being extremely moisture, acid and alkali-proof. Practical long range tests are said to have proved the value of the new coatings in the protection of metal, wood and concrete surfaces against corrosive attacks of acid and alkali vapors and liquids.

Sold under the trade-name of Mayco Protective Coatings, the new materials are said to be far superior to oil, nitrocellulose and asphaltic paints and lacquers. When correctly applied, they form a tenacious, pore-free, water and gas-tight film, which in spite of great hardness remains flexible. After thorough aging, the coatings become very hard and resistant to great mechanical stresses. The films are also fire resisting and are not affected in any way by heat up to 250° F.

Your RUBBER RED BOOK

This column will appear from time to time and will contain changes or corrections which have come to our attention and which should be made in the 1937 Rubber Red Book Directory we recently published. By transferring the changes appearing in this column to their individual copies, holders of the Directory will have available correct data at all times.

Pages 23 *and* 65: Crystal Golf Ball Co., Wakefield, Mass. Delete. Believed inactive. No answer to correspondence.

Pages 30 *and* 64: George Mfg. Co., Haverhill, Mass. Delete. Believed inactive. No answer to correspondence.

Pages 33 *and* 60: L. W. Hayden Rubber Co., Los Angeles, Calif. Change address to 1026 South Grand Avenue.

Pages 35 *and* 63: Howard Rubber Products, La Porte, Ind. Delete. Believed inactive. No answer to correspondence.

Pages 38 *and* 60: Latex Products Co., Los Angeles, Calif. Delete. Believed inactive. No answer to correspondence.

Pages 41 *and* 71: Midland Rubber Co., Salem, Ohio. Delete. Company out of business.

Page 43: Oak Hill Sponge Rubber Co., Oak Hill, Ohio. Change listing of officers to read as follows: Pres., W. A. Byrider; Vice-pres. and Gen. Man., L. P. Waldron; Sec.-Treas., W. A. Byrider, Jr.

Pages 47 *and* 70: Pretty-Scheffer Rubber Co., Carrollton, Ohio. Delete. Believed inactive. No answer to correspondence.

Pages 58 *and* 61: Willard Rubber Co., San Diego, Calif. Change name of company and address to Pacific Rubber Paint Corp., 2320 Newton Avenue, San Diego, Calif.

Page 110: Eugene F. Phillips Electrical Works, Peterborough, Ontario. Address should be Brockville, Ontario.

Page 235: Under "Balata" listing add the following: T. A. Desmond & Co., Inc., 33 Rector Street, New York City.

Native craft on Lake Titicaca

Collecting Wild Rubber in South American Jungles

Pioneer Adventures in Collecting, Coagulating and Shipping Rubber in Peru Experienced by the Author Who Spent Seven Years in the Jungles

By F. G. Arnold

IT is difficult to realize that almost a quarter of a century has passed since plantation rubber has usurped "wild" rubber. Rarely does one even hear about the collection of "wild" Hevea rubber any more or about life in the South American jungles, once the dominant factor in providing the world with rubber for manufacturing purposes. It was from these jungles that Sir Henry Wickham finally managed to transport enough rubber seeds to Kew Gardens in London and thereby nurture the vast plantation rubber industry which now exists in the Far East. The author was one of the small group of white men concerned with the collection and shipment of "wild" rubber from South America in the "early days." He spent seven years in the Peruvian jungles. It is his hope that this article with its accompanying pictures, which will indicate the difficulties concerning the collection and shipment of "wild" rubber only a few years back, will prove of interest to the modern day rubber industry and its members. The locale under discussion is that of Peru.

The general procedure in vogue at the time was this: the government would grant a concession, usually consisting of several square miles, to a corporation and in return for the privilege of exploiting the concession for rubber, the corporation would agree to open up the jungle area and to build acceptable roads. In my case, I was the manager of such a corporation. Our concession was situated on both banks of the Inambari River, a tributary of the Madre de Dios River, in turn a tributary of the Madera River which flowed into the great Amazon River.

In order to reach the concession, we had to enter from the East. We landed at Mollendo on the Pacific Coast, the port being only about 10 feet above sea level, and then took a train to the City of Arequipa. This city, which is 350 miles from Mollendo, a distance traveled in one day, has an altitude of 6,700 feet. Arequipa is a trading town and one of our agents was located there. These agents did our banking, shipped us food and supplies, and handled our rubber for export. Arequipa lies at the foot of the Andes in the mountainous region called Cordillera. The city boasts a modern observatory, supported by an American university. The university also has an observatory located at the top of Misti, an active volcano approximately 21,000 feet high, which can be seen in the distance from Arequipa. The sky in this region is exceptionally clear, making it an ideal spot for planetary studies.

From Arequipa we still had two more days of travel

(All photos by the author)

Tapping and coagulating methods practiced in Peru are shown at the right. Tapping is repeated daily from October to June. The primitive method of coagulating rubber by turning a paddle over a smoky fire is still the preferred method.

by railroad. The end of the first day found us at Juliaca, where we had to remain overnight because the trains did no running at night from that point on. About half-way between Arequippa and Juliaca we passed over the highest point on the railroad line. This point, which is 14,000 feet high, is called Crucero Alto. Approaching Crucero Alto, the train crawled so slowly that a good runner could easily have kept pace with it for miles. Not very far from Juliaca is the town of Puno, situated on the shore of Lake Titicaca, the highest and largest lake in the world. It is told that when the Spanish conqueror Pizarro came to Peru, the Incas threw a long, heavy gold chain into the lake. To this day adventurous souls still seek to locate this legendary gold chain.

Heading for the Interior

The following day we journeyed again by rail until we reached Santa Rosa, about 10,000 feet above sea level, and the last stop for us on the railway. Like most towns in the Cordillera, Santa Rosa is an Indian trading town, and the trading activities, which include pottery, flutes, farm produce, and other various products, present a colorful and picturesque scene.

The corporation maintained another agency in Santa Rosa. It was the duty of these agents to see to it that supplies forwarded from Arequipa from our agents there reached us in the interior. They also were responsible for transporting the rubber we sent from the interior to the coast for export. When we set out from Santa Rosa, our caravan included 300 mules. In addition, we took along a number of llamas for transporting cargoes over particularly hazardous mountain paths. A peculiarity of the llama is that he will not carry more than 100 pounds of freight. Exceed this load by 10 or 20 pounds and a llama lies down and refuses to be budged, no matter what the punishment. Therefore, freight to be carried by llamas is generally packed in 50-pound cans, two cans being strapped on each llama.

Our trail from Santa Rosa took us across the Cordillera over an altitude of more than 12,000 feet. At this high altitude very few horses can bear up, and the only transportation facilities left are mules or human feet. It took us fully three days to cross the Cordillera —navigating rivers, crossing tortuous mountain paths, plunging through dense tropical vegetation, etc. The nights were spent at haciendas, comparable to the American ranches in the West. These haciendas are usually owned by wealthy natives who generally live along the coast and occasionally visit them to check up on the foremen or overseers they leave in charge. The haciendas are worked by peons who raise potatoes, beans and other farm products, in addition to sheep and llamas.

Reaching the Main Camp

Following an extremely narrow road, after crossing the highest point in our journey, led us to the village of Ollachea, which is about 7,000 feet high. Here the corporation maintains a warehouse, office and other facilities. This village is the last contact place with the outside world, our subsequent journey leading us into the heart of the rubber jungle where the corporation's collecting camps were located. Leaving Ollachea, it took us two days to reach the main camp, called Chaquimayo because it was situated on the bank of a river of the same name, a tributary of the Inambari River. To reach this main camp we traveled over the road constructed by the corporation in accordance with its agreement with the Peruvian Government. In constructing this road, the crude native bridges over chasms, swamps, etc., were replaced with sturdy cable bridges; at some spots the road had to be tunneled; paving was employed at several swampy areas.

When we first arrived at Chaquimayo, it was still a maze of dense vegetation. After several years of effort, however, we cleared a respectable area and grew maize, pineapple, bananas, coffee plants and cocaine plants. The Indians chewed the leaves of the cocaine

Upper Left: A group of Bolivian Indians reporting at the camp ready for their yearly efforts. Upper Right: Native method of cultivating the soil, the oxen being guided by ropes tied to their legs. Lower Left: A large family of savages before their hut in the jungle. These savages do no work, only hunt and fish. Lower Right: View of one of the sub-camps in the heart of the Peruvian jungle.

plant constantly. Chewing on these leaves gave them the same artificial stimulation that cocaine produces in the drug addict. Even the messengers taking the mail across the Cordillera from the main camp would make far better time when given a goodly portion of the leaves to chew. We also had a natural swimming pool at Chaquimayo.

Crews were sent out from Chaquimayo to establish sub-camps and to collect the "wild" rubber. Mules were used to send food into the denser interior and to bring out the rubber. Because it was generally too hot and uncomfortable to ride mule-back, most of the traveling out of the main camp was accomplished on foot. The main road extended several miles beyond the main camp. From the main road we branched out narrow trails to the various spots where the rubber trees were clustered.

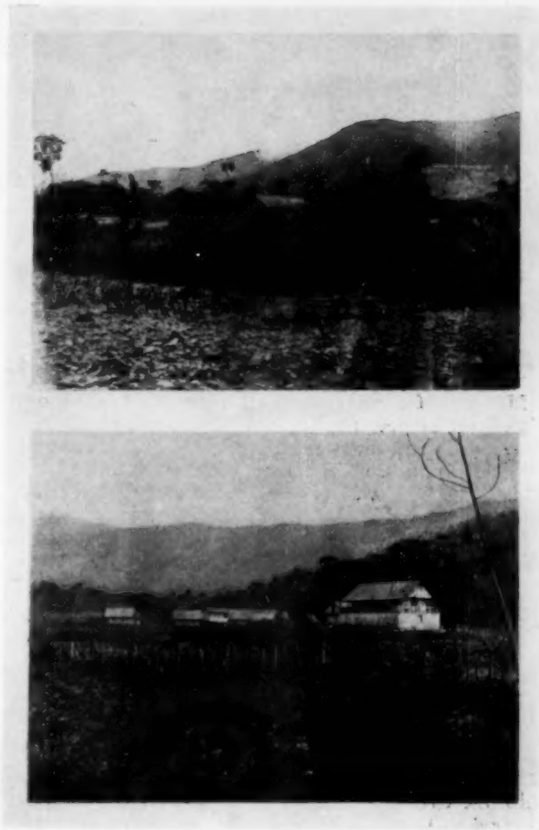
In collecting rubber in the Peruvian jungle, the first step is to locate the rubber trees. The best time to locate these trees is during the months of August and September, when the Winter season is current, but curiously enough the entire jungle, with the exception of the rubber trees, is green. During this period of the year the rubber trees are dormant. It is a simple matter to pick out the rubber trees at this time because whereas all the other trees in the jungle sprout green leaves, the leaves of the rubber tree have changed to brown. The brown leaves stand out prominently against so much green. The Indians are then sent out to the spots where clusters of rubber trees are determined, and each is given a specified area to work. Their first job is to clear the area and to make trails, called "estradas." By the time these "estradas" are made and temporary huts put up in the clearings, it is usually time to start tapping operations.

Collection of Rubber in Peru

In Peru, the Indians generally begin tapping operations about 5 o'clock in the morning (as do the natives in the Far East), finishing the setting up of collecting cups around 10 o'clock. Then, after an hour's rest, the Indian makes a second round and collects all the latex caught by the cups. Usually, he returns to his sub-camp by 2 o'clock in the afternoon, at which time he starts to coagulate the collected latex. The Peruvian Indian builds a small oven of clay in which he burns palm wood and the nuts from the uri-curi (sometimes called Kuri-Kuri) tree. He then coagulates the latex by the paddle method. Although in comparison with modern methods this is a primitive method of coagulating rubber, in the author's opinion none of our plantation rubber has yet attained the same qualities of Para Fine or Bolivian Fine rubber. The tapping, collecting and coagulating processes are repeated daily from October to June. During rainy days all tapping is stopped to avoid the dripping of excess water into the collecting cups.

In addition to Peruvian Indians, rubber collectors in Peru also employ Bolivian Indians. Both types are contracted for through the mayor of the villages from which they come. These Indians live in villages on patches of land given to them by the land owners hiring them, and generally cultivate these patches in a primitive manner. Wooden plows, for instance, drawn by oxen are employed. These oxen are guided by ropes or lines tied to their legs. The women do all the weaving necessary to furnish the family with clothes. Our corporation had approximately 500 Indians employed.

Besides the Indians on our estate, we were also surrounded by savages—the natives of the jungle in which we were working. The Peruvian savages will not work. They would come to us for clothes, food and novelties, and in exchange would hunt and fish for us, and also build us canoes. The women do all the other work necessary to exist other than hunting and fishing. None of these savages read or write, and have absolutely no cognizance of money or its value. They still worship the sun, moon and stars. The Bolivian and Peruvian Indians, however, are far more civilized. They know the value of money and are keen traders. Once cheated, rarely do they extend trust again. Very few of these Indians read or write, but they are all exceptionally religious and attend their churches regularly.



Top: View of Chaquimayo, the main camp maintained by the corporation in Peru represented by the author, at the time of his arrival. Bottom: The same camp after several years of hard work of clearing the grounds, forming a natural swimming pool, cultivating patches of ground on which various vegetables and fruits were raised, and other similar efforts.

In addition to the Indians and savages described, there is another class of jungle people in Peru—also savages. This latter type of savage is generally "owned" by Portuguese traders and are little more than slaves or serfs. These savages collect "caucho" rubber. The collecting operation is far different than that employed in collecting Hevea rubber. The savages hew down the trees and the latex is collected on palm leaves on which the trunk of the tree is made to rest when chopped down. The bark of the fallen tree is then stripped and the latex flows freely. After it dries, the latex is removed from the leaves and rolled into bundles weighing between 200 and 300 pounds each.

A comparison of the aforegoing story and its accompanying illustrations with the pictures and reports which come from plantations in the Far East will readily reveal to the reader the difference in collecting estate rubber and "wild" rubber.

Plastic Materials from Rubber and Tar Products

By Sir Gilbert T. Morgan and Dr. D. D. Pratt

AT the request of the Rubber Growers' Association, Messrs. Morgan and Pratt recently carried out investigations on new applications of rubber, particularly in conjunction with tars and rosins. These investigations were carried out in the Chemical Research Laboratory (Teddington, England) of the Department of Scientific and Industrial Research. In the course of this work, rubber and its better known modifications were used. The results of the investigations were given in a paper presented before the Midland Section of the Coke Oven Managers' Association, at a meeting held recently in Sheffield. An abstract of this paper, which originally appeared in the abstract of this paper, which originally appeared in the presented herewith.

IT IS known that rubber is not compatible with high temperature tars and that, although anthracene oil dissolves rubber, addition of pitch to such a solution causes immediate separation of the rubber. The problem, therefore, appeared to be that of developing a stabilizing medium for anthracene oil—rubber-pitch complexes.

The amount of rubber which can be introduced, in one run through the Hurrell homogenizer varies with the type of oil. Low temperature tar oil can absorb 7 to 8% of its weight of rubber, whereas 5% is the maximum for anthracene oil. The final clear limpid solutions, however, can be utilized as fresh starting material, and solutions containing up to 20% of rubber can thus be concentrated.

Pitch Added To Samples

When pitch was added to samples of these solutions of rubber in tar oils, it was observed that whereas the mixtures obtained with low temperature and vertical retort oils were stable, the corresponding products containing high aromatic oils induced a separation of rubber in the form of a coagulum.

On the other hand, high aromatic tar oils are unsuitable as a medium for pitch and rubber when the former is in greater concentration than 10.0% of the mixture quite irrespective of the rubber content.

In seeking for an explanation of the differences in behavior of these tars towards rubber, it is recalled that oils of low aromatic tars are chiefly paraffinoid, and substantially free from the crystalline constituents with which anthracene oil is saturated. It would appear that, although the crystalline components of anthracene oil do play an important part in the stability of rubber and pitch mixtures in that oil, yet the paraffinoid oils of low temperature tar form a better medium than the wholly aromatic oils of high temperature tars.

Two possible methods for the preparation of stable complexes of high aromatic tars with rubber are, therefore, suggested. First, the utilization of a high aromatic oil not saturated with crystalline hydrocarbons obtained by refrigeration and filtration of anthracene oil, or by selection of a distillate such as "dead oil" distilling between the naphthalene and anthracene fractions. The second method of stabilization suggested is the dilution of a high aromatic tar by an oil substantially free from solid hyrocarbons.

Other Rubbers and Tars

Rubber-tar complexes similar to those derived from latex are obtainable from crepe rubber which, when milled in the presence of tar oils, is converted into a plastic material containing approximately 80.0% of rubber and 20% of oils. All grades of Rubbone are readily compatible with the various types of tar, this incorporation being accomplished by heating the materials at 120° C. for one hour. The blended products are stable homogeneous liquids of increased viscosity and "stiction" as compared with the original tar.

Vulcanized rubber does not dissolve in tar oils, but forms dispersions which, however, by suitable manipulation can be obtained as gels. When vulcanized latex and tar oils are passed through a colloid mill at 100° C. water is removed and ultimately a clear gel is produced. Such gels are obtainable from vulcanized latex and oils from any type of tar and, furthermore, addition of pitch causes no separation of rubber. A series of results indicated that nitric crumb is moderately compatible with high temperature tar. Longer treatment at 145° C. of the two components did not lead to any improved products. However, following the conditions described in B.P. 428,100 nitrite crumb was dissolved in tar oils and when pitch was subsequently added stable products containing up to 3.0% of the modified rubber were produced. When nitrite crumb was used in excess of this proportion coagulation invariably occurred. With tars of paraffinoid type nitrite crumb produces more satisfactory results.

Chlorinated Rubber and Tars

Chlorinated rubber dissolves readily in tars or tar oils, so that the blending of this rubber derivative with tars is very quickly effected by heating a mixture of the components to 100° C. for 2 hours. The most noteworthy feature of the products so obtained is a high degree of elasticity, which is a novel property for tar products. Chlorinated rubber has also been blended with vertical retort and with low temperature tars, but it was found that as the tar oils became increasingly paraffinoid, so the stability of the final tar-rubber product decreased. It will be noted that the behavior of chlorinated rubber towards the various types of tars is the converse to that of natural rubber, being readily soluble in "aromatic" tars and less soluble in paraffinoid tars. The property of elasticity

conferred by chlorinated rubber, particularly on horizontal retort and coke oven tars, may be attributed in part to the plasticizing effect of the tar oils on the rubber derivative and in part to the resinoid contents of the tar acting as a reinforcing "filler." Experiments were carried out on the drying properties of chlorinated rubber-tar products, and it was concluded that the addition of small proportions of the rubber derivative accelerated the rate of drying of the tar.

Alternative Method of Preparation

An alternative method has been developed for the preparation of tar products containing chlorinated rubber. When chlorine was passed into solutions of rubber in appropriate tar media, or into dispersions of vulcanized rubber in any tar, products were obtained resembling those furnished by direct solution of chlorinated rubber in tars. It is to be noted that this method of chlorination *in situ* leads to a product consisting of chlorinated rubber in *chlorinated tar oils*. When pitch was added, with the aid of stirring at 120° C., to this material new blends of tar products were produced, exhibiting a high degree of elasticity.

Rubber hydrochloride behaves similarly to chlorinated rubber in combination with tars, being readily soluble in high aromatic tars to yield homogeneous, stable products, rather less elastic than the corresponding chlorinated rubber product. On the other hand, this new rubber hydrochloride-tar material possesses improved "stiction," so that its adhesion is superior to the chlorinated rubber-tar complex.

Rubber Derivatives and Synthetic Resins

One of the chief applications of synthetic resins of the bakelite type is in the production of insulating materials, and for this purpose the resin is used in conjunction with fillers, such as wood meal. Up to the present very little use seems to have been made of rubber as a filler, although rubber itself is a very good insulating material. Experiments, however, suggest that vulcanized rubber may prove a most valuable accessory in combination with bakelite resins.

A series of products ranging from 90 parts of resin and 10 parts of rubber to 10 parts of resin and 90 parts of rubber have been prepared by the following method. The vulcanized rubber was precipitated from "Vultex" (vulcanized latex) in fine particles by the addition of ethyl acetate, filtered, washed through with acetone to remove the last traces of water and dispersed in benzene. The measured solution of bakelite resin in acetone was then added, care being taken that the ratio of benzene to acetone was 3:1 and the mixed solvents removed under reduced pressure. In preparations containing up to 50.0% of rubber, the material remaining after removal of solvents consisted of a thick homogeneous syrup, which slowly hardened to a brittle mass as the last traces of solvent were removed. For molding purposes these materials were powdered and sieved. When the preparations contained more than 50.0% of rubber they consisted of increasingly resilient materials, which could be disintegrated, but not powdered. These rubber-resin complexes were molded under pressure at 150° C. to yield articles of increased flexibility as the rubber content increased.

The incorporation of chlorinated rubber with bakelite resin is effected by methods similar to those described in the case of the vulcanized material. In this case, however, the rubber derivative is dissolved in benzene, thus allowing a completely homogeneous blend with the acetone solution of resin. Results suggest that chlorinated rubber may prove to be superior even to vulcanized rubber as a filler in conjunction with bakelite resin.

Other Applications of Chlorinated Rubber

At the present time considerable quantities of chlorinated rubber are being imported, mainly for use in the paint industry, but much attention is being given to the development of this material for insulating purposes, owing to a peculiar property it possesses of assuming a vesicular form. The "expanded" modification of chlorinated rubber is effected by submitting the material at 140° C. to pressure, which is quickly released at the end of the molding period. At the Chemical Research Laboratory this property of chlorinated rubber has been extended to the production of a series of laminated products. Chlorinated rubber alone, or in conjunction with fillers, such as asbestos, can be molded into machineable products, but these materials are improved by the addition of small proportions of plasticizers, such as butyl phthalate.

The increasing attention now being paid to chlorinated rubber led us to examine methods whereby this material might be produced without the intervention of solvents. It was found that liquid chlorine at –40° C. readily reacted with rubber to produce in 10 minutes a product containing 60.0% of chlorine. By removing excess chlorine at –40° C. under reduced pressure it was established that this reaction between rubber and chlorine took place wholly at this low temperature. The effect of the liquid halogen is first to convert rubber to a jelly-like mass, and thereafter, if sufficient time is allowed, to dissolve the rubber completely. This method of chlorination has been applied also to vulcanized rubber, nitrate crumb, Rubbone, and with partial success to latex.

Chlorinated Rubber Development

THE progress made in the development of chlorinated rubber in the world was the subject of a paper recently delivered before a meeting of the Society of Chemical Industry in London, England, by J. P. Baxter and J. G. Moore. They listed the five principal brands now available as follows: Tornesit (German and American), Alloprene (British), Tegofan (German), Pergut (German), and Detel (British). In addition to these, three Japanese, one Italian, and one other German company are producing chlorinated rubbers. Several patents on modified forms of chlorinated rubber have also been taken out quite recently in France, Russia, Austria and Jugoslavia.

Although the primary use for the chlorinated rubbers still lies in the paint field, additional uses are being rapidly developed. Chlorinated rubber in the unplasticized state can be molded thermoplastically under pressure and both semi-translucent and opaque products have been so molded. These molded materials are said to compare favorably with other molded insulating materials in regard to dielectric properties. Among other suggestions advanced is their use as tank linings and pipe-jointing compounds, non-inflammable dielectrics, sealing media, and as substitutes for linseed oil base in linoleum manufacture.

The speakers also told of transparency tests on films of chlorinated rubber one-thousandth of an inch thick, which were plasticized with dibutyl phthalate, and which showed that the absorption of visible light by these films was negligible, being of the same order as that of cellophane.

New Equipment

Amthor Tensile Strength Tester

DESIGNED in conformity with standard specifications for determining simultaneously the tensile strength and elongation of rubber, wire, cordage, paper and other materials, the Amthor Universal Tensile Strength Tester has been announced by the Amthor Testing Instrument Co., Inc., 10 Leo Place, Brooklyn, N. Y. The new tester occupies a floor space of 18 x 22 inches, and is 74 inches high. It is furnished with

the proper clamps and pulling speeds for testing any or all of the materials mentioned. Clamping distances are adjustable with automatic stop limits. The pulling clamp has a maximum travel of 24 inches and returns quickly to its exact starting position after each test. The load is indicated directly by the capacity lever on a 24-inch radius quadrant having a triple range scale. Reading remains fixed after the specimen breaks. The elongation dial indicator is graduated from 0 to 4 inches in 0.05-inch subdivisions and also in per cent based on 6 and 10 inch clamp distances. A vertical indicator, for testing rubber, is graduated in 1/10-inch subdivisions. Pulling speeds can be regulated for 3, 12 and 20 inches per minute. The tester is furnished with a 1/6 h.p. constant speed motor.

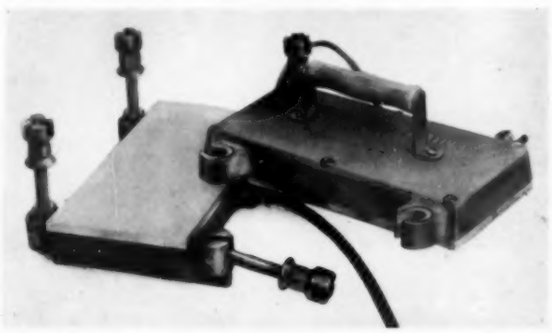
Farrel-Birmingham Mill

FEATURING anti-friction roller bearings for the roll journals and direct drive of the rolls from the worm gear unit without the usual intermediate drive gear and pinion, a new 8 x 14-inch mill has been developed by the Farrel-Birmingham Co., Inc., Ansonia, Conn. The new mill was especially designed for processing rubber and plastic stocks which develop high heat. The mill is driven by a 10 to 15 h.p. direct current motor, having variable speed from 400 to 1,200 r.p.m. Gearflex couplings connect the motor with the gear unit and the gear unit with the drive roll of the mill. The connecting gears have cut spur teeth and are enclosed in a combination gear guard and oil pan. The rolls are fitted with joints especially adapted to high temperatures while the guides are of the self-adjusting type. The entire assembly of the

mill, gear unit and motor is mounted on a one-piece steel box section baseplate which is heat-treated to relieve stresses that may have developed during fabrication. The baseplate is also machined for mounting the several units in accurate alignment.

Ton-Tex Belt Vulcanizer

A GENERAL utility vulcanizer for making "Ton-Tex", fabric or rubber belting endless has been developed by the Ton-Tex Corporation, 129 West 22nd Street, New York City. Weighing only 36½ pounds, the new vulcanizer may be used on belts on the machines or on benches set up near the machines. Aluminum alloy is used throughout the construction of the vulcanizer to secure the light weight and portable features. Vulcanizing time is said to be reduced by at least one-third by heating both the upper and lower platens on the new curing device. This double-heat-platen principle is also said to eliminate the dangerous and time-consuming operations required when thick belts are vulcanized in place on the machines. The new vulcanizer, which may be used on either alternating or direct current, is equipped with a specially developed thermostat which prevents it from departing from the true vulcanizing temperature range while in service. In operation, the upper platen is swung edge-



wise off from the lower platen, a single permanent bolt acting as the axis. The lapped ends of the belt, with cement applied, are then laid on the lower platen and the upper platen is swung back into position and clamping pressure applied by four nuts which may be turned either with wrench or screw driver. Belts up to 7-inch width may be handled in one operation, while belts from 7 to 10-inch width require two operations.

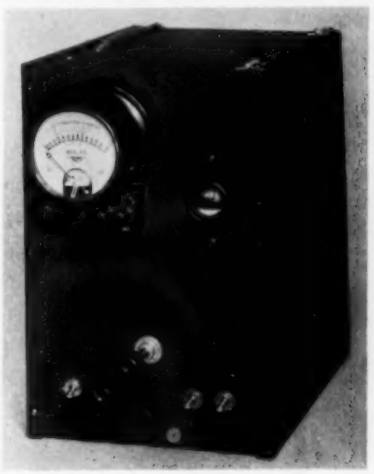
Sharples Vacuum Ultra-Centrifuge

OF SPECIAL interest to the producers and users of concentrated latex is a new piece of laboratory equipment developed by the Sharples Specialty Company of Philadelphia, Penna., called the Sharples Vacuum Ultra-Centrifuge. Centrifugal concentration has long been used as one of several methods for the concentration of rubber latex. The new instrument, which develops a centrifugal force approximately 250,000 times the force of gravity, will prove especially useful in research which is now in progress, according to its manufacturers. For instance, the rate of sedimentation of latex particles in the ultra-centrifuge is expected to provide data for a more accurate determination of the specific gravity of the material which composes the particles, which in turn may lead to a more thorough knowledge of the composition of the particles themselves.. The new instrument uses a cell type rotor. The cell is installed in a rotor which is operated at a speed of 80,000 r.p.m. The rotor is suspended on a vertical axis and metallic mirrors, made by the condensation method, direct light through the cell and then into a camera arrangement so that photographs may be taken at regular intervals making use of the light absorption of the sample. The rotor oper-

ates in a chamber that should be evacuated to approximately .2 micron, under which condition the temperature rise of the sample does not exceed 2° C. during the course of 4 hours' running. The use of vacuum enables the rotor to turn 5 times as fast (thus generating 25 times the centrifugal force) without increasing the driving power. A thin flexible spindle supports the rotor. The turbine on the spindle is driven by compressed air. It requires 20 to 30 minutes to reach full speed after starting and about 30 minutes to come to a full stop. The ultra-centrifuge is ready for operation after the connection of a single air line and a line to the vacuum pump. The inner extremity of the cell slot which contains the sample revolves on a 1.094-inch radius, the outer extremity on a 1.407-inch radius. The cell holds ¾ c.c. of a sample. The rotor diameter is 3.5 inches. In operation a small amount of the sample is placed in the sector-shaped cell which has glass or quartz windows; the machine is speeded up to 10,000 r.p.m. and the vacuum is brought up to the proper level; the speed is then further increased to 80,000 r.p.m. A shaft of light is directed through the rotating cell and photographs are taken at intervals of time. At the termination of the run the photographs are checked with a microphotometer for density vs. a blank, the amount of subsidence in each is determined, and the rate of subsidence is calculated.

Republic Reflectometer

A DEVICE for measuring the light reflection from rubber and other surfaces has been perfected by the Republic Chemical Machinery Company, 154 Nassau Street, New York City. Called the "Republic Reflectometer," this new device may be used in the



rubber industry for measuring the finish of a surface, for comparing the intensity of blacks, for comparing reflectance and the gloss of lacquered or enameled surfaces, and, in special cases, for measuring the extent of "bronzing." The measuring instrument operates on a purely comparative basis rather than on standard light intensity units. Actually, it determines the intensity of light required to "play" upon the test specimen in order to achieve a certain intensity of reflection at any pre-determined angle of light incidence. The apparatus includes a focusing column, a specimen holder, a photo-electric cell, and a cathode ray tube. When the bias is delivered to the grid the shadow in the cathode ray tube, which under normal operating conditions is wired to a spread of a 90° angle, is closed to a 0° angle. In operation, the test specimen is placed in the holding device and the intensity of light directed at the panel is varied until a 0° angle is achieved in the cathode ray tube. Because the quantity of light necessary to produce a complete closing of the shadow in the tube is a constant, the reading on a voltmeter which is hooked in parallel across the lampbank is an indirect but precise measurement of the reflectance value of the surface involved since the voltage across the lampbank is proportional to the intensity of light emitted by the lampbank and brought to "play" upon the test specimen. By means of a special arrangement, the specimen holder can be varied through a wide array of angles with regard to the focusing column thus making it possible to measure the reflectance value of any particular surface in any number of angles, making possible, in turn, the calculation of a mean reflectance value for that surface.

To Owners of Noble's "Latex in Industry"

The author has prepared an addenda and errata list which represents not only errors in patent numbers and typography but which includes a number of references originally omitted from the book This list, in printed form which may be readily pasted into the original copy, is available without cost to all purchasers of the book. Address requests to THE RUBBER AGE, 250 West 57th Street, New York City.

Book Reviews

Latex and Rubber Derivatives & Their Industrial Applications (Vols. II and III.) By Frederick Marchionna. Published by THE RUBBER AGE, 250 West 57th Street, New York City. 6 x 9 inches. 1,670 pp. $20.00 for both volumes (not sold separately).

(A Review by DR. ERNST A. HAUSER)

It is almost five years since Volume I of *"Latex and Its Industrial Applications"* by F. Marchionna, was published. Those who are actively engaged in research or development work with latex, or who are interested in the vast number of patents dealing with latex and a variety of its related fields, have well considered it as their standard reference book. The reviewer feels with them that the value of this publication cannot be overestimated and that by its intrinsic worth it has become indispensable. With such a background of substantial precedent we confidently turn to the new volumes—II and III.

In the five years that have passed the development of applications for latex has apparently not diminished. Rather the contrary has been true, more patents having been applied for and granted in these years than in all previous years. It is not astonishing, then, that all who have benefited from Marchionna's first book in this series eagerly anticipated the advent and release of the continuation to this work which had been announced for some time. Two new volumes, II and III, covering the period from June, 1932, to January, 1937, have just come off the press. They contain 2,932 abstracts pertaining to latex patents and literature, and 941 abstracts on the various types of rubber derivatives. Volume II has been subdivided into thirteen chapters, while Volume III contains nine.

The first chapter of Volume II concerns itself with latex and its properties and contains references to work dealing with the latex in the plant and to the special properties of latex. The next chapter is devoted to the conditioning of latex, discussing by specific paragraphs the subject of preservation; concentration of latex by heating; by creaming; centrifuging and filtration; miscellaneous latex treatments; acid latex; thermal-sensitized latex, which is becoming of increasing importance; and coagulation. The introduction to this chapter is writte ans a survey of the topics just listed, and is contributed by *John McGavack*. He has summarized the different methods of conditioning latex in a very brief but precise and complete fashion, which greatly adds to the value of the abstracts contained in the chapter. *P. Schidrowitz* introduces the subject matter of Chapter Three, regarding vulcanized latex and vulcanization processes. The well-known author's differentiation between vulcanization of latex in the liquid state and that of latex coagulum and of dry latex rubber is contained therein. Chapter Four is likewise preceded by a foreword by *P. Schidrowitz*, and concerns itself with the compounding of, and to compounded, latex. These excellent introductory remarks contain a review of the most important factors to be considered when compounding latex and when using compounded latex for various applications. The subdivision of this introduction into the different methods of applications, for example, dipping, deposition, impregnation, spreading, etc., should be a practical help in grouping the abstracts of this chapter.

An examination of latex dipping processes and dipped articles will be found in Chapter Five of this volume, *C. A. Beal* introducing this subject to the reader. For the purpose of clarifying this field of application, the author has advantageously applied a differentiation between the colloid chemical mechanism causing deposition, as for instance, straight dipping, or deposition by the use of filtering membranes, by gelling, or by ionic influence. Chapter Six refers to rubber threads and the manufacture of filaments. *D. F. Twiss* furnishes the introduction to this chapter, treating chiefly coagulation processes for obtaining latex threads. Other processes equally commercialized today and to which reference is made in the patent abstracts of the chapter have been regrettably somewhat neglected.

Textile fabric manufacture is treated in Chapter Seven and is headed by an admirable introduction, unsigned, which presumably was written by *Mr. Marchionna* himself. The reader cannot fail to receive a clear, comprehensive review of the present applications, and for any one skilled in the trade it should demonstrate the many possibilities that are still untouched in this field. The chapter following deals with paper and artificial leather manufacture, the discussion being led by a contribution from *Geo. A. Richter* and *M. O. Schur*. Since these authors are pioneers in this particular field, the chapter comes well recommended. Coating and impregnation are introduced in Chapter Nine by *A. Szegvari*, who efficiently points out that this general field must be subdivided into permanent and temporary protective coatings, depending on the actual purpose of the finished goods.

Chapter Ten devotes itself to electrical insulation, with short introductory remarks on the most pertinent processes; Chapter Eleven dealing with porous rubber products. *D. F. Twiss* contributed the introduction to the latter, commencing with a discussion of the older art of manufacturing sponge rubber from ordinary crude rubber. He emphasizes the advantages of the application of latex in this specialized field. After a brief reference to the pioneer work of Schidrowitz and Goldsborough, the foaming process developed by Dunlop is discussed in detail. A somewhat more detailed reference to other sponge processes now in commercial use and to which reference is made in the abstracts would have added to the completeness of this introduction and been more in line with the objective handling of the abstracts and literature references.

The subject of floor and road coverings is taken up in Chapter Twelve, being subdivided in the introduction into paving materials for roads, playgrounds, etc., floor covering of the linoleum type, and such coverings and mats in the form of pre-cut sizes. The last chapter of Volume II is devoted to shoe manufacture.

Volume III is an innovation insofar that it is not a specifically directed book on latex applications but rather condenses in the first four chapters a variety of items that are difficult to classify in definite fields. Chapter XIV is concerned with a discussion of rubber powders that have become sufficiently interesting during the last few years. A short description of the various processes now known in the manufacture of powdered rubber is given and the possible applications of this new type of crude rubber discussed in a general way.

Miscellaneous processes and products, such as the use of latex in packing, in the manufacture of abrasives, etc., in friction lining and general insulation, are to be found in Chapter XV. The tinroduction to Chapter XVI contains an historical review of the development and gives an excellent survey of the preparation and use of so-called mixed dispersions, *i.e.*, mixtures of artificial rubber dispersions with wax emulsions, resins, cellulose derivatives, bitumen, etc. The reviewer considers this chapter of special information and commendable to the reader because unquestionably this field is very much in its infancy as far as further developments go. Chapter XVII deals with the electrodeposition of rubber and is introduced by a contribution from *C. E. Beal*, who gives a short discussion on the theory of electro-deposition.

Part II of Volume III is devoted to rubber derivatives and their industrial application. The author questions the wisdom of this addition. Considering the great importance which rubber derivatives have acquired in recent years there seems to be no reason for this anxiety. The author is to be congratulated for having incorporated this review in his book. *Harry L. Fisher* has written a special chapter entitled the "Composition and Structure of the Rubber Hydrocarbon." It is an excellent treatise of this highly debatable problem. Chapter XVIII refers to oxidized rubber; Chapters XIX and XX, to hydrogenated rubber and halogenated rubber products, respectively; and Chapter XXI to cyclized rubber. The latter is introduced by *L. B. Sebrell* and *E. J. Morris*, wherein they discuss the preparation of cyclized rubber and its application, as well

as the production and use of halogenated derivatives and rubber halides. This is followed by a very valuable bibliography. The last chapter of this volume, Chapter XXII, takes up the condensation products of rubber. An elaborate author's index, an index of patentees, of patents, and a subject index concludes the third volume.

If one may draw a comparison between the first volume and the two just published, the reviewer is of the opinion that the organization of the new supplements, as for instance, the more careful subdivision of topics, the addition of individual summarizing chapter introductions, make the new volumes even more valuable than the first one. A further improvement from the point of view of ready reference is the heading arrangement on every page, giving the country to which the patents on that page refer, or being entirely devoted to literature reviews. The patent abstracts, again, refer to the United States, Great Britain, France, and Germany. Another advantage is having the literature references carefully combined to the end of the patent references of each chapter.

With these two new contributions, Marchionna has not only performed a herculean task for a single individual but has again added to the literature of rubber two volumes which will be at the top of the list for many years to come. The three complete volumes will serve the industry faithfully and well, a monument to the man who wrote them, and an achievement of which the rubber industry can truly be proud. Likewise, the gratitude of the industry and that of every rubber chemist and technologist is due THE RUBBER AGE, New York, for having undertaken to publish this excellent and outstanding work.

A number of typographical errors in the spelling of names of patentees and in the reference numbers of abstracts should be corrected at the next possible occasion.

E. A. H.

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Recueil des Communications. Published by Revue Généralè du Caoutchouc, 19 Boulevard Malesherbes, Paris, France. 8½ x 10½ inches. 212 pp. 100 Francs (approximately $4.50).

All of the 38 papers delivered at the recent International Rubber Congress held in Paris on June 28-30, 1937, appear in this "review of the papers." In addition, the welcoming speeches made by the executives of the various organizations sponsoring the Congress, and a complete list of technologists visiting the Congress, divided by nationalities, are included. Of the papers, 11 are devoted to the properties and applications of latex, 19 to the properties and applications of rubber, and 8 to synthetic rubbers and chemical derivatives of rubber. This book serves a very useful purpose, but it is to be regretted that it appears only in French.

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A.S.T.M. Standards on Electrical Insulating Materials. Published by the American Society for Testing Materials, 260 S. Broad St., Philadelphia, Penna. 6 x 9 inches. 374 pp. $2.00.

In addition to the latest report of A.S.T.M. Committee D-9 on Electrical Insulation Materials, this compilation includes all of the 37 specifications and test methods covering the various types of insulating materials composed by the Society. Two proposed standards covering tests for neutralization number of petroleum products and specifications for rubber insulating blankets are also included. Of particular interest in this edition are discussions on the significance of tests involving dielectric strength tests, resistivity tests, and impact tests, each discussion having been prepared by a prominent technologist.

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Eye Hazards in Industrial Occupations. By Louis Resnick and Lewis H. Carris. Published by the National Society for the Prevention of Blindness, Inc., 50 West 50th St., New York City. 6 x 9 inches. 248 pp. 50 cents.

Although published several years ago, this handbook for safety engineers, inspectors, committeemen and all others responsible for industrial operations, is being re-offered to industry at a price said to be considerably below cost in order to secure wider distribution. The volume contains 247 pages and 59 illustrations dealing with the safeguarding of eyesight.

How to Deal with Organized Labor. By Alexander Feller and Jacob E. Hurwitz. Published by the Alexander Publishing Co., Inc., 60 Wall St., New York City. 6 x 9 inches. 664 pp. $6.50.

The purpose of this book is primarily to present the labor situation to employers in such manner that it will enable them to deal intelligently, effectively and economically with their individual labor problems, and to that end the co-authors (both members of the bar) have extensively surveyed the labor field from the creation and operation of unions to the recently-enacted laws affecting employer-employee relations and the legal decisions handed down to date with regard to those laws. The book is exceptionally impartial on a difficult subject and deals throughout with facts not theories. By means of a question-and-answer method, collective agreements are analyzed; labor's tactics and methods during strikes are dissected; and the rights, duties and privileges of employers under the National Labor Relations Act are explained. A Table of Court Cases, a list of Decisions of the National Labor Relations Board, and a subject index effectively round out the book.

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Chemistry of Petroleum Derivatives. (Vol. II). By Carleton Ellis. Published by Reinhold Publishing Corp., New York City. 6 x 9 inches. 1464 pp. $20.00.

(*Available from* Book Department, THE RUBBER AGE.)

The subject matter of the author's first book on the chemistry of petroleum derivatives, published in 1934, is continued in this second edition, although in some cases additional references to work published prior to the publication of the first edition have been included. The new edition covers two fields untouched by the first, *i.e.*, the chemistry of asphalts and the production of hydrocarbons by treatment of carbon monoxide with hydrogen. A complete chapter in this second volume is also devoted to Petroleum Hydrocarbons in Anesthesia, a new field of scientific research. The book contains 54 chapters, plus extensive name and subject indexes. References to the relationship between petroleum derivatives and crude, synthetic, sponge, and other types of rubber, appear throughout the work.

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Chemistry of Synthetic Surface Coatings. By Wm. Krumbhaar. Published by Reinhold Publishing Corp., New York City. 6 x 9 inches. 200 pp. $4.00.

(*Available from* Book Department, THE RUBBER AGE.)

This book is of special interest to the paint and varnish industry and to the suppliers of compounding ingredients to that industry. The important problems of chemical reactions in the varnish kettle and of surface chemistry of pigments and paints are discussed from a fundamental point of view. The physical chemistry of surface coatings and of drier chemistry are reviewed from the same viewpoint. The author, in charge of technical development for Beck, Koller & Co., Inc., uses a number of microphotographs to lend emphasis to his beliefs. The book has 5 chapters, 39 illustrations, a lengthy appendix, and a complete subject index. Brief mention is made of chlorinated rubber films.

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Aromatic Products. (Catalog No. 10). Givaudan-Delawanna, Inc., 80 Fifth Ave., New York City. 8½ x 11½ inches. 40 pp.

This attractively bound and illustrated catalog, designed to serve as a guide to the purchase and use of aromatics, includes not only a list of all the important aromatic materials produced by Givaudan-Delawanna for the perfume, cosmetic and soap industries, but also covers a number of the aromatics used in the rubber, paint, textile and printing ink industries. In addition to listing the aromatics, suggestions as to their applications are made.

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News About du Pont Rubber Chemicals (Dec. 6, 1937). Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. 6¼ x 9½ inches.

This latest edition of the monthly news letter includes two reports, one on Neoprene Type H (N-11) and the other on Neoprene Type M (N-12), as well as a reprint from *Industrial & Engineering Chemistry* on the "Influence of Metallic Oxides on Neoprene Properties," by Howard W. Starkweather and Herbert W. Walker.

Editorial Comment

Prospects for 1938

THERE is no question that the current condition of business is a matter of serious concern. If it is some consolation, the consensus of opinion among leading economists and industrial leaders is that the downward trend will halt shortly and an upward swing will occur by early spring. Despite the depression, however, rubber manufacturers in general finished the past year in grand style and for the most part face the coming year with cautious but unmistakable optimism. This is as it should be.

New sales records were hung up by the industry during the past twelve months. In particular, the mechanical goods division of the industry surpassed by far the activity of any previous year. It is a good omen for the future of the trade that rubber products were put to many new uses during the year. Rubber was used in products initially introduced to industry and, equally as important, a large quantity of rubber went into products in place of such competitive materials as plastics, cork, fibers, etc. It is safe to predict that additional new uses for rubber will be found in the next twelve months.

How successful a year 1937 was to the rubber industry is beginning to be appreciated by the financial statements released by the manufacturers. Firestone showed a profit of $9,269,176, based on the largest net sales in its history. Lee increased its earnings over the previous year. Norwalk earned $63,711, three times that of its 1936 report.

The confidence of the industry in its own future is best expressed by the expansion developments. Considerable new construction was started and completed during the year. Such expansion is still continuing, despite the recent falling off of sales. Firestone has begun to equip its recently purchased plant at Fall River, Mass., which will be devoted exclusively to the manufacture of latex products. In the past few weeks, Dryden Rubber has announced the purchase of a factory at Keokuk, Iowa, to supplant its Chicago operations. Only sponge rubber goods will be made at the new plant. Additional expansion plans will soon be launched by other manufacturers.

Although original equipment tire sales during the coming year are expected to fall off approximately 30%, tire manufacturers predict that an expected increase in replacement sales will balance the scale, not in total number of unit sales but in dollar profits, since there is generally a wider profit margin in such sales. Greater demand for truck tires and for tires for agricultural equipment is also foreseen.

Tire Prices

MANY consumers, as well as dealers, protested the two price rises instituted during the past year by the tire manufacturers. If these same consumers and dealers view the results of a tire survey recently made by the Rubber Manufacturers Association they could well wonder why the increases averaged only 10 to 20%. According to the survey, the average price of crude rubber in 1937 was up 584% and the average price of cotton was up 100% since the approximate low point of the depression in 1932. Furthermore, wages in the tire industry increased 50% in the same period. Figures of the Bureau of Labor Statistics show that these wages were the highest paid by any of the mass production industries.

In addition to the increased cost of rubber and cotton, rubber manufacturers, like those in other industries, were faced with other important cost factors, such as overhead, selling and distribution expenses, and the sharp increase in taxes. Considering these factors collectively and looking backward it seems somewhat surprising that tire prices did not increase more sharply. The greatest achievement of the tire industry during 1937, however, was probably continuation of stability in the price situation, despite one or two attempts by the mail order houses to force a return to the price wars of previous years.

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Goodyear Jubilee

A SPECIAL committee has been named by Dr. A. R. Kemp, chairman of the Rubber Division, A.C.S., to formulate a suitable program to commemorate the discovery of vulcanization by Charles Goodyear during the general meeting of the American Chemical Society in Boston in the Fall of 1939. Goodyear discovered the theory of vulcanization while conducting experiments in the kitchen of his home in Woburn, Mass., near Boston, in 1839. The year 1939 marks the one hundredth anniversary of that discovery.

Were it not for the accidental discovery that the addition of sulfur to rubber plus heat rendered the rubber immune to the elements, it is doubtful whether the rubber industry would have reached its present state. Every manufacturer engaged in the production of rubber goods therefore owes a debt to the memory of Charles Goodyear. One excellent method of paying that imaginary debt would be to offer full cooperation to the special committee appointed to formulate a suitable program in 1939.

CURRENT • NEWS of the Rubber Industry

JANUARY, 1938

Optimism Expressed by Rubber Manufacturers for Industrial Trend During the Coming Year

Increased Demand for Rubber Products in Agriculture, Growth in Truck Tire Sales, and Greater Demand for Replacement Tires Are Indicated by Industry's Leaders

INCREASED demand for rubber products in agriculture, greater demand for replacement tires, a widened market for truck tires, and the development of new uses for rubber loom as the highlites of the rubber industry picture for 1938. Considerable optimism has been expressed on all sides with regard to the status of the industry during 1938. Although it is not expected to reach the sales peaks recorded during the past year, even the prospects of some drop in business are not enough to overshadow the optimism reflected in the statements issued by the industry's leaders. Particular emphasis is laid on the development of new uses for rubber, an indication of the extent to which such uses can carry the industry having been given this past year.

Tire manufacturers especially are said to be in excellent condition for early profits. Most of the manufacturers entered 1938 with inventories of raw material and finished goods underpriced in relation to finished tire prices. With good prospects for an upward swing in replacement sales to offset an expected curtailment of original equipment business, tire manufacturers are optimistic. Rubber going into tires in the next few months, during which prices are expected to hold steady, will stand the manufacturers around 15 cents a pound because of inventory write-downs, as contrasted to tire prices which are based on approximately 18-cent rubber. The widening of the profit margin, however, will be offset in part by the necessity of spreading overhead against a smaller total sales volume due to the expected drop in original equipment tires.

Statement by Robertson

Sales volume in the rubber industry was the best in 1937 for any year since 1929, said S. B. Robertson, president of the B. F. Goodrich Company. In his opinion, an important development during the year was the erection of new plants in various parts of the country to meet new requirements placed upon rubber manufacturers by their principal customers. He declared that improvement of manufacturing and shipping facilities, together with expansion of its research efforts, finds the rubber industry in position today to take advantage of any early upswing in business.

Referring to the coming year, Mr. Robertson made the prediction that the tire replacement business will show an increase if business conditions improve somewhat. He also made the statement that an increasingly important market for new tire sales appears to be on the farm where rubber is rapidly replacing the all-steel wheels on farm vehicles which number at least 10,000,000 units, including 1,300,000 tractors. With regard to new markets for rubber which are continually being opened through research, Mr. Robertson made the following statement:

"A recent cross-section survey of American industry shows that 139 out of 506 companies manufacturing machinery, transportation equipment, instruments and appliances use rubber in one form or another. Twenty-three reported that they are using greater amounts of rubber today than ever before. In this survey, rubber leads all other non-metallic materials of construction such as plastics, felt, cork, leather and pressed fiber in these industries . . . Indicative of the expanding uses of rubber is the further development of the rubber de-icer for airplanes . . . More than 400 pounds of rubber are used today in street car construction for wheels, truck springs, window channels, and pole mountings."

Test Rubber Paving

A pavement of black and brown rubber has been under test for the past several months at the entrance to a large plant, where traffic is particularly heavy, in Moscow, Russia. The experiment is proving highly successful, according to word reaching the Bureau of Foreign and Domestic Commerce at Washington, D. C.. The pavement is noiseless, neither ice or snow remains on it in winter, and it is easy to wash. Based on the experiment the Moscow City Council is planning rubber pavements in several of the city's largest business sections.

P. W. Litchfield, president of the Goodyear Tire and Rubber Company, expressed the hope that "the natural forces of recovery, together with whole-hearted cooperation between government, business and the public, will soon make their effects felt and contribute to better times for all," while Clifton Slusser, vice-president and factory manager of the company, stated that he expected an early return to normal operating conditions.

O'Neil Sees Greater Sales

Predicting increased sales through dealer outlets for 1938, W. O'Neil, president of the General Tire and Rubber Company, regards the tremendous development in motor-truck transportation in the past few years as "one of the most important factors in the growth of our business, as well as throughout the industry." In his statement, Mr. O'Neil said that more than 700,000 new trucks were sold in 1937, an increase of 50,000 trucks over the total number sold in the preceding year, and pointed out that it is practically certain that more trucks will be sold during the coming year than were sold in 1937.

Referring to current business conditions, Mr. O'Neil had this to say: "In the depths of the other recent depression, our company's dollar sales fell off, but not our unit sales. Our dollar sales decreased then because the cost of raw materials dropped radically, but that it is not true today and we look for no falling off in dollar sales."

ACTIVATED CARBON PATENTS VOIDED

On an appeal from the District Court of the United States for the Northern District of Illinois, Eastern Division, the United States Circuit Court of Appeals recently reversed the findings of the lower court and declared several claims of the Chaney patents (U.S.P. 1497543 and 1497544) invalidated as to product claims. These patents, covering activated carbon processes, have been in litigation in various courts for many years. The suit involved was that of the National Carbon Company, *plaintiff*, vs Western Shade Cloth Company, *defendant*. National Carbon claimed that Western Shade Cloth was infringing several claims of the Chaney patents by its use of activated carbon for the recovery of solvent vapors. The court found that "such claims are for the function, result or effect of the real invention and, therefore, void."

Decision of the Court

Western Shade insisted in the District Court and reiterated in the Circuit Court that the claims were void under the Act of Congress defining the requisites of claims because they were not limited to what the patentee described but covered any product endowed with the qualities of retentive power or service life claimed to be that of what the patentee discovered and described. Judge Lindley, delivering the unanimous decision of the court, said, "A manufactured article may be claimed as a new product, but this claim of the product must set forth its essential characteristics and qualities or define it as the product resulting from a described process and, if the character of the product depends upon the manner in which it has been produced, particularly, it should be claimed only as the thing produced by the specific process . . . In the present case the product is defined solely in terms of the function of the product . . . Thus, to give effect to the claim, would be to grant the monopoly upon any carbon, whatever its composition, its structure or the manner of its manufacture, which has the claimed absorbent power.

"Chaney . . . could not, as he attempted to do in the product claims in suit, by reciting the achieved effect of his specific article, obtain a monopoly upon any article that would produce an identical effect without regard to whether it was made as he made it or by a process substantially equivalent thereto . . . The claims are invalid. The decree of the District Court is reversed with directions to proceed in a manner consistent with this opinion."

The only other trial in which an infringement suit on these patents went to the merits was brought by National Carbon against Barneby-Cheney Engineering Company in the Southern District of Ohio, Eastern Division. The late Judge Sater acting as special master reported to the court that the patents were invalid because the claims were functional and because "the service life and retentivity tests are so indefinite and uncertain as to be void under Section 4888, U.S.R.S."

A petition filed by National Carbon for a re-hearing of arguments on the Western Shade appeal, filed since the court's decision, has been denied.

Coming Events

Feb. 1. Los Angeles Group, Rubber Division, A.C.S., Mayfair Hotel, Los Angeles.

Feb. 4. Boston Group, Rubber Division, A.C.S., Fox and Hounds Club, Boston.

Mar. 28-29. Spring Meeting Rubber Division, A.C.S., Book-Cadillac Hotel, Detroit, Mich.

Apr. 18-21. Spring Meeting, American Chemical Society, Dallas, Texas.

May 23-25. London Rubber Conference, London, England.

Oct. 10-14. National Safety Congress, Hotel Stevens, Chicago, Ill.

APPOINT COMMITTEE FOR 1939 MEETNG

Dr. A. R. Kemp, of the Bell Telephone Laboratories, chairman of the Rubber Division, A.C.S., has appointed a special committee to arrange a suitable program to be presented at the general meeting of the American Chemical Society scheduled for Boston, Mass., in the Fall of 1939, to commemorate the discovery of vulcanization by Charles Goodyear. The hundredth anniversary of this discovery, made in the village of Woburn, Mass., near Boston, will be celebrated in 1939.

The executive members of the special committee are: J. M. Bierer (Boston Woven Hose), as chairman, and C. R. Boggs (Simplex Wire) and W. B. Wiegand (Binney & Smith). Members of the advisory board to function with the committee include the following: E. B. Babcock (Firestone), E. R. Bridgwater (DuPont), W. De Laney (Seamless Rubber), R. P. Dinsmore (Goodyear), W. A. Gibbons (U. S. Rubber), B. Longstreth (Thiokol), A. T. McPherson (Bureau of Standards), T. Midgley, Jr. (Ethyl Gasoline), J. W. Schade (Goodrich), H. E. Simmons (University of Akron), and A. A. Somerville (Vanderbilt).

OFFER MADE FOR OVERMAN TIRE CO.

Alex Kreger, who recently advanced the sum of $15,000 to enable the Overman Cushion Tire Company to continue operations at its Belleville, N. J., plant, has made an offer to buy the assets of the company. A hearing was scheduled to be held before United States District Judge John W. Clancy in the United States Court House Building in New York City on January 14th for cause to be shown why an order should not be entered to sell Overman to Mr. Kreger or to sell the company in accordance with any other or better offer that may come before the court at that time.

According to Mr. Kreger's offer, he would take right, title and interest to all Overman assets, subject to the $83,000 indebtedness due the Reconstruction Finance Corporation, local taxes of approximately $20,000, various taxes accumulated and salaries unpaid since September 13, 1937, lien and certificate of indebtedness given by Overman to Mr. Kreger amounting to $15,000, and any accounts payable accrued since September 13, 1937.

Terms of the Offer

Mr. Kreger, who runs an auto truck renting business in New York City, proposes to pay Overman in reorganization or any party designated by the court, the sum of $30,000 in cash, and agrees to form a corporation to which all of the old Overman assets will be transferred, the new corporation to enter into a contract with creditors providing that a sum not exceeding $30,000 of the profits of the business, which are to be earned over a period of 10 years, not to exceed 10% of such profits per year, will be set aside and distributed among creditors whose claims are unsecured. He also agrees that the proceeds of any recovery from litigation now pending against the Goodyear Tire and Rubber Company shall be turned over to creditors, "subject to any and all valid and subsisting liens thereon."

In the event his offer is accepted, Mr. Kreger contemplates obtaining an agreement from the Reconstruction Finance Corporation to the effect that it will waive any defaults now existing under the old contract and extending the time for payment of the indebtedness over a convenient period of years in installments and on terms satisfactory to the new corporation. He also made it clear that it was his desire to acquire the Overman concern as a going business and stated that the offer was withdrawn in the event that operations are interrupted or cease prior to possible approval by the court.

Start Rubber Brokerage

T. A. Maguire & Company, Inc., has announced the opening of offices at 50 Broad Street in New York City. The company, recently organized, will operate a rubber brokerage business.

SURVEY INDICATES TIRE PRICES TOO LOW

Although the average price of crude rubber in 1937 was up 584% and the average price of cotton throughout the year was up 100% since the approximate low point of the depression in 1932, the average price of tires increased only 32%, according to the Rubber Manufacturers Association, which has just completed a survey of the tire industry.

Furthermore, wages in the tire industry increased 50% in the same period, and were the highest paid by any mass production industry, according to figures of the Bureau of Labor Statistics. Similarly, other important cost factors, such as overhead, selling and distribution expense, and especially taxes, also increased sharply.

"Tire buyers possibly more than any other class of consumers have been getting constantly increased value for their money," the Association states. "As a result of unremitting research and improved methods of manufacture, the industry today produces tires that run ten times as many miles as those of 25 years ago, cost only one-quarter as much, and give infinitely more comfortable transportation with less tire trouble."

Production of automobile tires in the United States during the first eleven months of 1937 was 52,313,000 units, as contrasted with 52,805,000 units for the same period of the previous year, and with 38,102,000 units for this period in 1932, according to the Association.

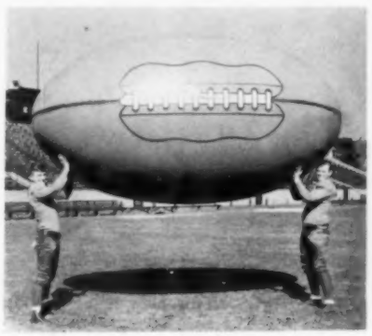
CHICAGO GROUP HAS DINNER AND DANCE

Over 200 members of the Chicago Group, Rubber Division, A.C.S., and their ladies, attended the Annual Ladies' Night Dinner and Dance held on December 10 at the Hotel Sherman in Chicago. Following receptions in the Blue Room and Rotary Room of the hotel, dinner was served in the College Inn. During dinner, the ladies were given individual gifts by the group. The entire evening was devoted to dancing and entertainment.

The dinner and dance was made possible through the cooperation of the following companies: Akron Standard Mold Co., L. Albert & Son, American Cyanamid & Chemical Corp., American Zinc Sales Co., Anaconda Sales Co., Binney & Smith Co., Godfrey L. Cabot, Inc., Carter Bell Mfg. Co., Cleveland Liner Mfg. Co., Continental Carbon Co., E. I. du Pont de Nemours & Co., Inc., General Atlas Carbon Co., Herron & Meyer, Kraft Chemical Co., Loeb Equipment Supply Co., Midwest Rubber Reclaiming Co., Monsanto Chemical Co., H. Muehlstein & Co., Inc., Naugatuck Chemical, N. J. Zinc Co., A. Schulman, Inc., Thiokol Corp., United Carbon Co., R. T. Vanderbilt Co., and Wiksnick-Tumpeer, Inc.

Construct Giant Football

The largest football ever built was recently made by the Goodyear Tire and Rubber Company, Akron, for use in connection with an important southern football game. Made of rubberized fabric, the football is approximately 12 feet in length and 7 feet



in diameter, and is designed in scale to represent a standard collegiate football. It was designed for air inflation. Thirty-one yards of rubberized fabric, 44 inches wide, were used in its construction. The finished football weighs approximately 60 pounds.

CONSIDERING OFFER ON LAMBERTVILLE CO.

An offer of $53,994 for the assets of the Lambertville Rubber Company, Lambertville, N. J., which has been operating under a receivership since early last year, was made on January 3 at a hearing conducted by Charles M. Weelans, referee in bankruptcy, held in Trenton, N. J. Action on the offer, made by Samuel S. Flug, an attorney of New York City, and further proceedings are being held in abeyance in order that John T. Crowley, trustee of the Lambertville concern, may have an opportunity to prove that a proposed plan of reorganization is financially possible.

The hearing was held for the purpose of securing a factual report as to whether Lambertville is insolvent and whether an order of liquidation should be entered by the referee. A majority of creditors are said to be of the opinion that the bid offered for the assets was far too low. It was announced that if the reorganization plan is approved, liquidation may be avoided. Creditors declare the concern is in debt to the extent of $540,000, including mortgages and accounts receivable. Lambertville employs approximately 400 for the manufacture of its rubber and canvas footwear.

As outlined at the hearing, the reorganization plan proposed involves the payment of cash to creditors, while mortgage indebtedness would be taken care of over a three year period. Creditors would be given preferred stock in the new corporation, with old stockholders receiving common stock only.

DRYDEN RUBBER CO. BUYS KEOKUK PLANT

The Dryden Rubber Company of Chicago, manufacturers of rubber products for automotive and general industrial use, has purchased a plant in Keokuk, Iowa, for the exclusive manufacture of sponge rubber products. The Keokuk plant will be known as the Rubber Industries Division, Dryden Rubber Company, and will be in charge of U. H. Parker. Mr. Parker was associated with Miller Rubber from 1919 to 1928, then went with the Featheredge Rubber Company as chief chemist, and returned to Miller in 1932 to become manager of its sponge rubber division. C. O. Frazier, formerly president of Rubber Industries, Inc., of Keokuk, has also been retained in an executive capacity for the new plant. He has been associated with the rubber industry for twenty years.

Dryden Rubber has also announced that Dr. H. A. Winkelmann and R. D. Hager have both joined the company and will be associated with the Chicago organization. Dr. Winkelmann, widely known in the industry for his many achievements in rubber research and co-author of the "Systematic Survey of Rubber Chemistry," was formerly associated with the B. F. Goodrich and General Atlas Carbon Companies. For the past few years he has been vice-president of the Marbon Corporation, a division of Borg-Warner, a position he resigned to join Dryden Rubber. Mr. Hager also served with Goodrich for a number of years and resigned as plant manager of the new Cadillac (Mich.) factory to make his new connection.

Tire Prices Reduced

Price reductions from 3 to 14% were announced on January 4 by both Sears, Roebuck and Company, and Montgomery, Ward and Company. The cuts were said to apply against mail order tires only and will remain in effect until February 28. Rubber manufacturers expressed no concern with regard to the price slashes, probably because mail order tires account for so small a percentage of the monthly totals. The effect on the industry of the spring dating plan orders to dealers is expected to forestall any general move toward price changes at this time, it is reported.

Stress Rubber at Museum

The use of rubber to make molds from which puppet heads can be cast after modeling was featured last month at the New York Museum of Science and Industry in Rockefeller Center, New York City. The display indicates how marionette heads may be modeled in clay, plasticine, or other materials and then coated with several layers of rubber. When the mold hardens, it is cut apart and may be used in casting heads of many different materials. These special displays are featured from time to time at the Museum.

Names in the News

WILLIAM SEWALL, assistant manager of the petroleum sales department of the B. F. Goodrich Co., Akron, since 1933, has been named department manager succeeding J. P. WOODLOCK who recently resigned to join a leading steel company. MR. SEWALL came with Goodrich in 1929 when the Hood Rubber Co. was taken over.

JOHN F. CUNNINGHAM, supervisor of production for the General Electric Co. since September, 1931, has been appointed assistant to the vice-president in charge of manufacturing. He started his service with the company in 1901 in the Schenectady (N. Y.) works.

JOSEPH P. KENNEDY, sales agent for the Chernak Looms, the manufacture of which has been taken over by the National Rubber Machinery Co., Akron, from the Anaconda Wire & Cable Co., will henceforth work with the Akron machinery concern. He has been associated with the wire industry for the past 30 years.

CHARLES A. STILLMAN, vice-president, Goodyear Tire & Rubber Co., Akron, has resigned as a member of the Akron School Sinking Fund Committee. His resignation was said to be due to press of other work and recent ill health.

T. W. CASEY, vice-president and sales manager, Seiberling Latex Products Co., Barberton, Ohio, was recently elected to the directorate of the Toy Manufacturers of the U. S. A.

WILLIAM W. "BILL" HIGGINS, who recently broke a leg while on a business trip to Chicago in the interests of the United Carbon Co., is reported to be recuperating rapidly and is expected to return to the company's offices in the near future.

F. B. DAVIS, JR., president, U. S. Rubber Company, delivered an address on "A Basis for Employee Relations" at the Congress of American Industry of the National Association of Manufacturers, held at the Waldorf-Astoria Hotel in New York City on December 9

H. P. SCHRANK, vice-president in charge of sales for the Seiberling Rubber Company, was elected a director of that company at the annual meeting of the company held in Akron last month. A. C. BLINN, executive vice-president of the Ohio Edison Co., was also made a director.

HENRY SCHIPPEL, engineer, B.F.Goodrich Co., Akron, delivered an address on the progress and use of synthetic rubber before a meeting of the Akron Optimists Club on December 15.

H. G. FARWELL, export manager, Raybestos-Manhattan, Inc., Passaic, N. J., was elected first vice-president of the Overseas Automotive Club, Inc., at the annual meeting of that organization held in New York City recently.

CHARLES E. WILSON, vice-president in charge of the appliance and merchandise department of the General Electric Co. since 1930, has been elected executive vice-president of the company. At one time he served as managing engineer in charge of the conduit and wire section at the Bridgeport (Conn.) plant.

HARVEY S. FIRESTONE, JR., returned on the *S.S. Europa* on December 15 after a lengthy stay at the Firestone plantations in Liberia.

WALTER J. COPE, at one time assistant treasurer of the Mohawk Rubber Co., Akron, has been re-appointed secretary to Mayor Lee D. Schroy of Akron.

DR. CHARLES A. KRAUS, Professor of Chemistry and director of chemical research at Brown University, has been elected president of the American Chemical Society for 1939. He was chosen in a national poll of the Society's 20,000 members.

J. G. SHAFER has been appointed manager of the repair materials division of U. S. Rubber Products, Inc., New York City. He was formerly connected with the advertising and sales promotion department.

N. A. GLANTZ has been appointed to the newly created post of field sales promotion manager of the tire division of the B.F. Goodrich Co., Akron. He had previously been in charge of the creation of retail advertising.

A. B. JONES, chairman of the New York City Tunnel Authority and former vice-president of the B. F. Goodrich Co., was elected a director of Goodrich on December 21 to serve the unexpired term of C. B. RAYMOND, resigned. Mr. JONES first entered the rubber industry as superintendent of the South Akron plant of the Diamond Rubber Co. in 1908.

HARVEY S. FIRESTONE, SR., chairman of the board, Firestone Tire & Rubber Co., Akron, passed his 69th birthday last month at his winter estate in Miami, Florida.

ERNEST L. KILCUP, president and treasurer of the Davol Rubber Co., Providence, R. I., was re-elected a director of the Providence Chamber of Commerce last month.

CONSUMPTION DROPS 12.2% IN NOVEMBER

Consumption of crude rubber by manufacturers in the United States during the month of November is estimated to be 33,984 long tons, which compares with 38,707 long tons during October. November consumption shows a decrease of 12.2% under October and is 32.6% under November a year ago, according to statistics released by the Rubber Manufacturers Association. Consumption for November, 1936, was 50,433 (revised) long tons.

Gross imports of crude rubber for November are reported to be 56,302 long tons, an increase of 7.2% over the October figure of 52,508 long tons and 27.1% over the 44,296 long tons imported in November, 1936.

Total domestic stocks of crude rubber on hand on November 30 are estimated at 217,586 long tons, which compares with October 31 stocks of 195,685 long tons and 211,480 (revised) long tons on hand November 30, 1936.

Crude rubber afloat to United States ports as of November 30 is estimated to be 81,302 long tons, which compares with 80,653 long tons afloat on October 31, and 73,691 long tons afloat on November 30 a year ago.

November reclaimed rubber consumption is estimated at 9,703 long tons; production at 12,406 long tons; and stocks on hand on November 30, at 24,620 long tons.

Cited for Doll Claims

The Federal Trade Commission has ordered the American Character Doll Company of New York City to cease and desist from claiming that its "paratex" dolls, made of hard rubber, are superior to composition dolls because of their being impervious to water. The government agency held that the composition dolls are not inferior because of the fact that they will disintegrate if left in water for a substantial time since they are not especially designed for immersion tests.

Reach Charity Quota

Although the rubber industry of Chicago was one of the last groups to be organized of the 54 industrial divisions of Chicago's seventh annual Community Fund drive it was one of the first to reach its established quota of $7,500. More than 3,000 employees in the industry were solicited for contributions. U. L. Harmon, vice-president of the Dryden Rubber Company, led the drive.

HERMAN MUEHLSTEIN, of H. Muehlstein & Co., Inc., New York City, was awarded a parchment scroll recently by the United Hospital Fund in appreciation of his services during the campaign to aid the hospitals and visiting nurse associations of New York. He acted as chairman of the rubber industries division in the industrial section.

Financial News

LEE RUBBER NETS $596,318 IN YEAR

Net income of $596,318, equal to $2.31 a share on 257,465 capital shares outstanding, as compared with profit of $563,825, or $2.20 a share on 256,465 shares outstanding, is reported by the Lee Rubber and Tire Corporation, Conshohocken, Penna., for the fiscal year ended October 31, 1937. The report includes the earnings of the Republic Rubber Division of the company.

Net sales for the period after all discounts and allowances amounted to $13,769,125, an increase of more than 25% of the net sales reported in the previous fiscal year. Operating profit before depreciation and excise taxes amounted to $1,400,143. Deducting $434,163 miscellaneous charges and $252,961 for depreciation of plant and equipment, plus $116,704 provided for Federal income tax (including $17,927 surtax on undistributed profits) resulted in the net income of $596,318.

In his report to the stockholders, President John J. Watson stated that the net current assets of the company amounted to $4,971,697, equal to $19.31 per share for each of the 257,465 shares outstanding. Total net assets at book value are in excess of $32.89 per share. He expressed the hope that Congress at its present session "will repeal or amend the undistributed profits tax law, for otherwise because of the heavy undistributed profits taxes, corporations may feel forced to declare too large a proportion of their profits in dividends and not set aside sufficient surplus reserves to keep them strong during years of declining business and decreased earnings."

FIRESTONE TIRE INCREASES PROFIT

Based on net sales of $156,823,094, the largest in its history, the Firestone Tire and Rubber Company, Akron, reports a net income of $9,269,176 for the fiscal year ended October 31, 1937, a slight gain over the $9,142,654 profit recorded for the previous fiscal year. The current net is equal to $3.33 each on the $10-par common stock outstanding, after dividend requirements on the $6.00 preferred stock, as compared with a payment of $3.28 a common share last year.

Profit from operations in the year reported on amounted to $11,839,383, after deducting $139,036,825 for operating expenses and marking off $5,946,885 to depreciation. Total income, including $778,877 from other income, reached $12,618,260. Deduction of other expenses, including interest payments of $1,176,453 and operation of subsidiary companies amounting to $2,172,629, brought the net income to $9,269,176.

Firestone's consolidated balance sheet as of October 31, 1937, reveals current assets of $88,332,891; other assets of $6,078,281; real estate, plants, etc., valued at $68,508,213; and additional assets making for a grand total of $166,192,482. This compares with current liabilities of $41,800,088; bonds of subsidiary companies set at $13,300,000; surplus of $42,319,624; etc.

In a statement accompanying the report, Harvey S. Firestone, Sr., chairman of the board, stated that the record of total sales was achieved "in spite of the fact that our Akron factories were closed during March and April due to a strike brought on by a labor union" and that profits were not only affected by this strike but also by the sharp decline in rubber and cotton prices in October. In this connection he pointed out that while rubber sold up to 27 cents a pound in March of 1937, it dropped to 14¾ cents a pound in October, and that cotton fell off from 15 cents to 8 cents a pound in the same period.

He also referred to the new Firestone plants at Memphis, Tenn., and Fall River, Mass., as well as the new Riverview, Mich., plant soon to be opened and operated by the Firestone Steel Products Co. His statement disclosed that the company's factories in Canada, England, South America, Switzerland and South Africa have been operating to capacity during the year. In closing his report, Mr. Firestone stated that there are now more than 550 Firestone Auto Supply and Service Stores.

SEIBERLING RUBBER REPORTS 1937 LOSS

Although showing an operating profit of $573,256 for the year ended October 31, 1937, the Seiberling Rubber Company, Akron, reports a net loss of $10,443 for the year due to sharp declines in rubber and cotton values which necessitated a large inventory write-down, plus depreciation and interest charges. Gross sales during the year amounted to $10,546,090, and net sales showed a 20% gain over last year, it is reported.

According to F. A. Seiberling, president, the company's financial position was strengthened by a net increase in working capital of $166,713, while the ratio of current assets to current liabilities, exclusive of debentures, also showed a gain at the end of the year. In explaining the loss, Mr. Seiberling stated that it was due to increased wages, increased taxes, and increased raw materials costs, and pointed out that whereas the cost of crude rubber increased by 74%, selling prices of tires increased by only 12% in the same period.

In concluding his report, Mr. Seiberling made the following statement: "Our debentures maturing November 15, 1937, have not as yet been paid or extended but a plan is being developed for reconstructing our financial structure which, when completed, will broaden your company's opportunity to strengthen its position in the industry and conduct a profitable business, thereby advancing the time when your company will be able to resume dividend payments."

Norwalk Tire & Rubber Co.

Year ending September 30: Net profit, after allowing $4,560 for surtax, amounted to $63,711, equal to 16 cents on each of 202,230 no-par common shares after annual dividend requirements on 8,784 shares of $50-par, 7% preferred stock on which undeclared cumulative dividends in arrears amounted to $3.50 a share. Net profit in the preceding year was $18,426, or $2.10 each on the 7% preferred shares.

Deliver Papers on Rubber

Rubber played an important role at the Fall meeting of the American Society of Agricultural Engineers, held at the Stevens Hotel in Chicago on November 29 to December 2. At a power and machinery session held on November 30 four papers touching on rubber subjects were given. These papers, and their authors, follow: *Rating Tires for Tractor Performance*, by J. W. Shields, manager, farm tire department, U. S. Rubber Products, Inc.; *Effect of Tire Sizes on Tractor Efficiency*, by R. H. Wileman, Purdue University; *A New Farm Transportation Unit*, by F. W. Duffee, University of Wisconsin; and *Some Dynanometer Tests of Tracks and Rubber*, by W. A. Harper, superintendent of proving grounds, Caterpillar Tractor Co. Headquarters of the American Society of Agricultural Engineers are maintained at St. Joseph, Michigan.

Approve New Standards

On the recommendation of several of its standing committees, the American Society for Testing Materials, through its Committee E-10 on Standards, approved for publication last August as tentative a number of new specifications and tests, including several on rubber subjects. These have now been made available. They include the following tentative methods: Test for Changes in Properties of Rubber and Rubber-Like Materials in Liquids (D 471-37T); Testing Rubber Insulated Wire and Cable (D 470-37T); and Test for Rubber Hose (D 380-37T). The two following tentative specifications have also been made available: Insulated Wire and Cable—Heat Resisting Rubber Compound (D 469-37T) and Rubber Gloves for Electrical Workers on Apparatus or Circuits Not Exceeding 3,000 Volts to Ground (D 120-37T).

NEW ENGLAND NEWS

The undistributed profits and capital gains taxes should be repealed immediately if uncertainty is to be taken out of business, President Charles E. Speaks of Fisk Rubber Company has declared in a statement to U. S. Senator Pat Harrison, terming the taxes "impractical and unworkable." He asserted it was impossible for a company to fulfill its legal and moral responsibilities to employees and stockholders under present conditions.

The requirement that on December 1 managements must estimate profits for the year ending December 31 was assailed by the Fisk executive, who said: "Profits under the rules . . . of the Treasury department are governed to a large extent by the inventory condition, which is priced at market or cost, whichever is lower . . . and who knows in these times what the market price is going to be on any commodity 30 days from now?"

A. G. Spalding & Bros., Chicopee, Mass., ran 10 per cent ahead of 1936 on its golf and tennis goods production during 1937. Factories at Chicopee Center and Willimansett ran briskly from early February into May, with production for that period 20 per cent above the level for the corresponding months in 1936. From May on, operations became more moderate and in the fall entered a decline greater than usual for the season. Peak employment was about 1,500. Lately, about 1,000 have been on the payroll, for the most part on four days a week.

Employees of the Fisk Rubber Corp., Chicopee Falls, Mass., shared a disbursement of $90,000 under the company's Christmas club plan. About 1,200 employees participated in the plan, and individual checks ranged from $50 to $500. The fund is made up entirely of employees' contributions, but the company supervises the system and maintains control of the deposits. The plan has been in operation since 1928.

Goodyear Rubber Company, Middletown, Conn., paid $5 a share on its preferred stock and 50 cents a share on common during December.

Sponge Rubber Products Company, Derby, Conn., has increased its capital stock from 10,000 to 15,000 common shares, the shares having no par value.

Factory Manager Walter H. Norton of U. S. Rubber Products, Inc., Naugatuck, Conn., has announced further curtailments in production, necessitated by business and weather conditions. Available work will be spread among present employees.

The Middletown Rubber Company, Middletown, Conn., and the Employees' Association have signed a 15-months' contract providing for four cents an hour increase in wages, a minimum hourly rate of 27½ cents, and a more definite production schedule. The contract also provides for arbitration of grievances when necessary, and there is a seniority clause.

Health Officer M. L. Palmieri of Middletown, Conn., and a representative of the State Department of Industrial Hygiene have pronounced as "a necessary evil" the odor resembling burning rubber which emanates from the brake-lining and clutch-facing departments of the Russell Mfg. Company. It was stated that the company has done everything possible to eliminate the odor.

Frederick M. Peyser has been elected a director of the Fisk Rubber Company, Chicopee, Mass., filling a vacancy caused by the death of Andrew J. Miller several months ago. Mr. Miller was a partner in Hallgarten & Company, New York, and the new director is also a member of that firm. Hallgarten & Company represents a number of Fisk stockholders.

C. E. Maynard, plant manager of Fisk, was guest speaker December 28 at the monthly meeting of the Springfield Time Study and Methods Association.

Revise Aromatics Division

The Naugatuck Chemical Division of U. S. Rubber Products, Inc., has announced that it has opened a new office at 153 Waverly Place, in New York City, for the handling of its aromatic business. The new branch will remain part of Naugatuck Chemical but will operate under the name of Naugatuck Aromatics (Division of U. S. Rubber Products, Inc.). Sales headquarters will be maintained at the new office, as well as a perfume laboratory and a complete stock of essential oils, absolutes and aromatic chemicals. Shipments will continue to be made from Naugatuck, Conn., on tonnage orders. All correspondence will be handled from the new office, which will be under the supervision of M. G. Couderchet.

Opening Lower Plant

Operations at the Ravenna, Ohio, plant of the Lower Rubber Manufacturing Company, a new enterprise, are expected to get underway sometime in January, according to M. S. Lower, president. Construction of the building has already been completed, nearly all the heavy machinery is installed, and only a few small pieces of equipment are yet to come. The company, which will manufacture toys and novelties, will employ about 15 when opened, and expects to employ approximately 50 in the next few months.

Era Moving to Dundee

The Era Specialty Company, Sandusky, Ohio, has begun the transfer of its machinery to Dundee, Michigan, where it will shortly remove its manufacturing activities. The first load of machinery has already been installed in the new plant. Era controls the Rubber Metal Specialty Company, its rubber manufacturing subsidiary, and manufactures plumbing and bathroom supplies. It also plans to produce rubber parts for the automotive trade when established in the Dundee factory.

Seek Local Rubber Source

A cooperative research company has recently been organized by German rubber manufacturers, the main object of which will be to determine whether bushes and shrubs capable of yielding rubber of commercial value can be cultivated in Germany or in any of the European countries, especially the Balkans. F. Funk, of Berlin, has been named to direct the activities of the new research organization.

TRENTON NEWS

The Thermoid Co., Trenton, employing more than 1,000, will not renew its contract with the United Rubber Workers of America, according to an announcement by Fred Schluter, its president. Mr. Schluter charged the union with violation of contract and declared the agreement void. In a notice sent to each employee he stated: "We will not operate a closed shop and nobody will have to pay dues to work for Thermoid." The agreement between the company and the union expires January 31.

Mr. Schluter was host to the members of the Thermoid Foremen's Club at a banquet held on December 22 at the Stacy-Trent Hotel in Trenton. There were 37 guests. George Fabel, president of Southern Asbestos Co., Charlotte, N. C., a Thermoid subsidiary, acted as toastmaster. Entertainment was provided after dinner.

The Alligator Rubber Products Co., Inc., Newark, has purchased several plots of land adjoining its plant for future expansion. The land acquired comprises 40,000 square feet and a factory is planned sometime in the Spring.

The December meeting of the Rubber Manufacturers Association of New Jersey was postponed until this month because of the death of its president, John A. Lambert, vice-president and general manager of the Acme Rubber Manufacturing Co.

A. W. Faber & Co., Newark, gave a $50.00 bonus to every employee with more than one year's service during Christmas week. The company, which employs 125, reports having enjoyed a prosperous year in 1937.

NEW YORK GROUP HAS CHRISTMAS PARTY

A capacity crowd of approximately 370 members and guests attended the 1937 Christmas Party and Meeting of the New York Group, Rubber Division, A.C.S., held on December 17 at the Building Trades Club in New York City. The scheduled business session, speaker, entertainment and distribution of lucky prizes were preceded by an excellent turkey dinner. The keynote of the business session was the election of officers for the 1938 season based on nominations introduced by the Nominating Committee, headed by Paul McCampbell (Kleinert). All of the officers were unanimously elected as follows:

Chairman, C. A. Bartle (DuPont); Vice-Chairman, A. H. Nellen (Lee Tire); Secretary-Treasurer, Peter P. Pinto (THE RUBBER AGE): Sergeant-at-Arms, R. E. Casey (Naugatuck Chemical); members of the Executive Committee: for one year terms—J. W. Crosby (Thiokol); W. J. Geldard (Fisk); J. H. Ingmanson (Bell Telephone Laboratories); for two year terms—C. R. Haynes (Binney & Smith); E. W. Schwartz (General Elec.); K. J. Soule (Manhattan Rubber); for three year terms—D. C. McRoberts (Kaysam); R. Berkowitz (Metal Hose & Tubing); John Ball (Vanderbilt). On the suggestion of the Executive Committee, it was also voted to make the vice-chairman and the retiring secretary-treasurer members of that committee.

Cholet Delivers Address

The speaker of the evening was Prosper E. Cholet of H. Muehlstein and Co., Inc., whose subject was "Recent Experiences at the Plantations." Mr. Cholet first described general planting practices on modern plantations in the Far East, where he recently spent some time, and stressed the attention being given to seedling and bud-grafting methods of cultivation. He then discussed the preparation and advantages of Essar, a softened rubber, and compared its properties with other types for specific uses. He presented charts showing the plastic and curing properties of Essar in comparison with standard grades and made the prediction that the industry would soon take further advantage of specially-prepared rubbers. In addition to his address, Mr. Cholet showed motion pictures taken by himself during his extensive trip, most of which was made by air.

Entertainment for the meeting was provided by a humorous monologist, introduced as "Professor" Pierce of the "University of Akron." His stories were well received. Colored motion pictures taken at the last outing and picnic of the group at Preakness, N. J., were also shown, with Walter Lingvoll of U. S. Rubber Products, Inc., handling the projector.

More than 200 gifts were distributed at the close of the evening to holders of lucky numbers. In addition to the prizes, E. I. du Pont de Nemours and Co., Inc., provided Buxton keytainers, with covers of neoprene, as table favors, while book matches were distributed by H. M. Royal, Inc. The unusually large number of gifts was made possible by the generous contributions of the following concerns:

Akron Standard Mold Co., L. Albert & Son, Anaconda Sales Co., Richard Best Pencil Co., Binney & Smith Co., Godfrey L. Cabot, Inc., Callaway Mills, Carter Bell Mfg. Co., Continental Carbon Co., Curran & Barry, Farrel-Birmingham Co., Inc., Flintkote Co., General Atlas Carbon Co., Imperial Paper & Color Corp., *India Rubber World*, Kaysam Corporation of America, Monsanto Chemical Co., H. Muehlstein & Co., Inc., National Sherardizing & Machine Co., Naugatuck Chemical Division of U. S. Rubber Products, Inc., N. J. Zinc Co., Paracord Co., Pequanoc Rubber Co., Parrot Speed Fastener Corp., and Philadelphia Rubber Works.

Rare Metal Products Co., Revertex Corp of America, THE RUBBER AGE, A. Schrader's Son, A. Schulman, Inc., Henry L. Scott Co., Somerset Rubber Reclaiming Works, Southwark Mfg. Co., Stamford Rubber Supply Co., C. J. Tagliabue Mfg. Co., Thiokol Corp., Titanium Pigment Corp., United Carbon Co., R. T. Vanderbilt Co., and Wishnick-Tumpeer, Inc.

Conduct Skiing Survey

Formerly only a minor sport, skiing in the short space of seven years has given rise to a $20,000,000 industry in America, according to a survey made by the B. F. Goodrich Co., Akron. The survey was made to determine the possibilities for new rubber uses in skiing and resulted in the development of a rack which can be mounted by rubber fittings on the tops of closed automobiles, thus permitting easy carriage of skis with no danger of damage to the cars.

Fisk Gets Merit Award

The Fisk Tire Company, Chicopee Falls, Mass., has received a merit award for 1937 for the development of its Safti-Flite tire from the Associated Industries of Massachusetts. The award was made on the basis that the new tire was "worthy of the high standards of research, craftsmanship, and consumer satisfaction inherent in Massachusetts industry."

Kaysam Moves Offices

The Kaysam Corporation of America has removed its general offices from One East 57th Street to 41 East 57th Street in New York City. The company, licensors of the Kaysam process of casting latex, recently moved its laboratory from Massachusetts to Passaic, N. J.

LOS ANGELES GROUP NAMES COMMITTEES

More than 100 members and guests attended the first monthly supper meeting of the new season of the Los Angeles Group, Rubber Division, A.C.S., held in the Rainbow Room of the Mayfair Hotel in Los Angeles on January 4th. Garvin Drew, vice-chairman, presided in the absence of Chairman Ed Royal.

The business session was occupied with the naming of the more important committees for the year. The Membership Committee includes Art Kroegar (Monsanto) as chairman, and Phil Ritter (U. S. Rubber), M. L. Pine (Firestone), R. R. James (Goodyear), and L. F. MacDonald (Goodrich). The Golf Committee consists of Al Pickard (Braun Corp.) and Earl Brooks (California Golf Products). Personal events will be handled by A. D. McPherson (Goodrich) and personal contact work will be in charge of T. Kirk Hill (Kirkhill Rubber). A. L. Pickard also heads the Employment Committee.

The featured speaker of the evening was Lloyd Eller, widely known health engineer and former director of the Balasore Technical School in Calcutta, India. His talk dealt largely with travel through Asiatic countries, particularly the desert areas, and with health work in those regions. The talk was illustrated with motion pictures. A short address on "Recording Instruments" was given by Al Pickard.

A door prize and a special prize, donated by S. E. Brennan of H. Muehlstein and Company, and W. D. Schwartz of the L. H. Butcher Company, respectively, were awarded during the meeting. The next session of the group will be held in the Mayfair Hotel on Tuesday, February 1.

Set Boston Meeting

The Boston Group, Rubber Division, A.C.S., has scheduled its next meeting for Friday, February 4th, at the Fox and Hounds Club in Boston, Mass. A paper on "Solvent Cements" will be delivered by Roland D. Earle of Angier and Earle, Inc., while Jesse H. Mason, of the Haartz-Mason-Grower Company, will review some of his experiences during his many years in the rubber proofing business. Additional features are also planned.

Open New Asbestos Mill

Emsco Asbestos Company has opened a new asbestos mill at the company's plant in Downey, California, according to D. W. Fether, president of the concern. All grades of Arizona asbestos will be produced and graded, including spinning fibres, Mr. Fether reported. Arizona asbestos, heretofore available in limited quantities, is used by the rubber industry. It is said to be practically free from ferrous content and to weigh approximately 50% less by volume than ordinary asbestos.

Obituaries

John Hancock Nunn

Word has been received of the death of John Hancock Nunn, one of the veterans of the British rubber manufacturing industry, at his home in Hellingly, Sussex, England, on December 13 at the age of 83. He was a great grand-nephew of Thomas Hancock, rubber pioneer and discoverer of mastication. In 1820, Thomas Hancock founded the first rubber factory in the world in London under the name of James Lyne Hancock, Ltd. He controlled the company until 1842 when he transferred the business to his nephew, James Lyne Hancock, for whom the firm had been named, who in turn willed it in 1884 to his grandnephew, John Hancock Nunn. In 1935 the company passed into the hands of the British Tyre and Rubber Co., formerly called the British Goodrich Rubber Co. The late John Hancock Nunn was a vice-president of the Research Association of British Rubber Manufacturers. He leaves one son.

John A. Lambert

John A. Lambert, vice-president, treasurer and general manager of the Acme Rubber Manufacturing Company, Trenton, N. J., and one of the pioneers of the American rubber industry, died on December 12 at the age of 76 of pneumonia in St. Francis Hospital at Trenton. Although he had been in failing health for some time, Mr. Lambert visited the Acme Rubber plant daily, and was confined to the hospital for only four days before his death.

Mr. Lambert received his education in Ireland, matriculating at St. Jarlath's College, in Tuam, County Galaway, one of the celebrated Catholic colleges, and subsequently studied at Oxford University where he also participated in crew and rowing activities. He then engaged in the rubber business in Chicago for several years and in 1902 came to Trenton where, together with the late George R. Cook, he founded the Eureka Rubber Manufacturing Company, predecessor of the Acme Rubber Manufacturing Company. Mr. Cook, who died in 1926, was the father of Horace T. Cook, now president of both the Acme Rubber and Hamilton Rubber manufacturing concerns.

Several years ago Mr. Lambert was an active sportsman indulging in golf, cricket, hunting and fishing, and for more than 30 years was a member of the Trenton Country Club. He also belonged to the Trenton Club and was a member of the Lotus Club when it was in existence. His industrial activities included membership on the directorate of the former Rubber Association of America, now the Rubber Manufacturers Association, and he was instrumental in organizing the New Jersey Rubber Manufacturers Association, of which he was president for a number of years. During the post-war period, he also served as president of the Trenton Chamber of Commerce. Mr. Lambert was a prominent member and benefactor of the Blessed Sacrament parish as well as a member of the St. Vincent de Paul Society. While still living in Chicago, he was made a life member of the Phil Sheridan Council of the Knights of Columbus.

The funeral was held on December 15 from his home and honorary pallbearers included Wm. A. Anderson, Bruce Bedford, E. T. Comly, Horace T. Cook, A. Boyd Cornell, W. H. Sayen, Charles E. Stokes, A. L. Viles, and Henry N. Young, all prominently identified with the rubber industry. Interment was in St. Mary's Cemetery.

Newton D. Baker

Newton D. Baker, secretary of war under President Wilson, who died at Cleveland, Ohio, on December 25 from a heart attack after a brief illness, was widely known in the rubber industry for his legal and financial connections. He was counsel for the Goodyear Tire and Rubber Company in a series of stockholders' suits which followed the reorganization of the company fifteen years ago and also served as a director of the company for some time, having been re-elected to the Goodyear directorate in November after having resigned in March of last year at the completion of a three-year term. During the days of the National Recovery Administration, Mr. Baker was drafted by the industry to draw up a code of fair trade practices. He was buried in Lake View Cemetery in Cleveland.

Fred L. Morgan

Fred L. Morgan, former manager of the automobile tire sales department for the Goodyear Tire and Rubber Company, Akron, was found asphyxiated by carbon monoxide gas in his car at a tourist camp in Springfield, Missouri, on December 22nd, apparently by his own hand. He was 54 years of age. Mr. Morgan was born in Alliance, Ohio, and joined Goodyear in 1915, remaining with the company up until five years ago. He was a graduate of Mt. Union College, a 32nd degree Mason, a Shriner, and a member of the Portage Country Club. He was also a Sigma Chi. At the time of his death he was a distributor in Springfield for the General Electric Company. He leaves a widow and daughter.

Morris Baumann

Morris Baumann, founder and general manager for several years of the Baumann Rubber Company, which formerly operated in New Haven, Conn., and is now known as the Howe Baumann Rubber Co., at Newark, N. J., died at his home in New Haven on December 29 at the age of 80. A native of Germany, Mr. Baumann came to America as a boy and was first employed by one of the Goodyear rubber companies in Naugatuck, Conn. Later he moved to New Haven and organized the Baumann Rubber concern. He was one of the first manufacturers in America to produce rubber balls and toys in multi-color, using German dyes. Mr. Baumann retired about 10 years ago. He leaves a widow.

Frederick A. Hodgman

Frederick A. Hodgman, vice-president of the Hodgman Rubber Company, founded by his grandfather a century ago, until his retirement more than 10 years ago, died at his home in Tuckahoe, N. Y., on December 15 at the age of 67. Mr. Hodgman was born in Tuckahoe in 1870, attended both the Bronxville and Halsey Schools, and joined the Hodgman concern shortly after finishing his schooling. At the time of his retirement he was in charge of manufacturing operations. Mr. Hodgman was one of the oldest and most active members of the New York Athletic Club. Funeral services were held at his home. He leaves a widow, two daughters and a son.

Rumanian Carbon Factory

The firm of Bata, the largest producer of footwear in Czechoslovakia and an important manufacturer of tires in recent years, has confirmed a report that the company will shortly establish a carbon black factory in Rumania. The factory will be known as "Romcar" and Bata expects to cover its entire carbon black requirements from its operation. One of the reasons advanced for Bata's decision to build the Rumanian factory is that the quality of carbon black made in Czechoslovakia, which is actually lamp black made from crude naphthalene, is not high enough to permit its general use in tires. The black to be made at the new factory, however, will be made from natural gas, and is expected to compare favorably with carbon blacks orginating in the United States.

Monsanto Absorbs Merrimac

In order to simplify its corporate structure, the Monsanto Chemical Company, St. Louis, Mo., has absorbed the Merrimac Chemical Company, the capital stock of which it has owned for the past eight years. Monsanto has assumed all of the assets and liabilities of the Merrimac concern which will continue operations at Everett Station, Boston, Mass., under the name of the Merrimac Division, Monsanto Chemical Company.

LOS ANGELES NEWS

A $100,000 addition to the B. F. Goodrich Company's Los Angeles plant has been completed and is in full operation, according to J. C. Herbert, general manager. The new building houses additional processing equipment and provides additional warehousing for crude rubber. Of particular interest is the new 15-inch, two-stage Gordon plasticator. This machine is of the latest design and with it has been installed all necessary auxiliary equipment. The complete plant now represents an investment in excess of $4,000,000.

Golf enthusiasts among the members of the Los Angeles Group, Rubber Division, A. C. S., are looking forward to the first tournament of the year to be held on the last Saturday of February. The golf course has not been selected at this writing but the golf committee chairman, Al Pickard, is busy on arrangements.

Fifteen new presses were added early in February to the equipment of the Rubbercraft Corporation of California, Ltd., in its Torrance (Calif.) plant. Two shifts are now employed and the new equipment has necessitated increasing the working force at the plant by approximately 25 per cent. The increased demands come largely from the oil and aviation industries, in both of which the Los Angeles area leads the world.

Charles Lamb, of the West American Rubber Company, Inc., who has been ill for some time, continues to show gains and expects to be back at his desk shortly.

Hearings Held on Bill

Hearings were held in Washington, D. C., on December 1, 2 and 3, and on January 4 and 5, before a special committee consisting of Senators, Representatives and members of the Interstate and Foreign Commerce Commissions, on H. R. 4722, a proposed legislative act which would enable the Federal Trade Commission to issue "cease and desist" orders if and when a manufacturer operating his own retail stores competes unfairly with his own independent retailers. Representatives of the National Association of Independent Tire Dealers, Inc., including George J. Burger, secretary and general manager, testified at the hearings. Opposition has been offered to the bill by the mail order companies, the National Association of Manufacturers, and others. The special committee is expected to render a report shortly.

Bibb Holds Conference

A two-day conference of sales representatives of the Bibb Manufacturing Company was held late last month at the company's home offices in Macon, Georgia. An annual banquet, held at the close of the conference, was addressed by William D. Anderson, president of the concern, who described the company's new heat-resistant tire cord as the "most outstanding development in the cotton textile industry in 50 years." Mr. Anderson related some of the comparative tests conducted by tire manufacturers which resulted favorably to the new cord. He also made reference to current business conditions and stated that the business men of the nation were pleased "to see the President offer a friendly gesture" and that they were willing "to help rehabilitate the crumbling fortunes of the country."

Expanding Rubber Division

Another addition, the third in two years, is being built by the Chamberlain Corporation, Waterloo, Iowa, to house machinery with which the company will expand its new rubber wringer roll division. The new project will cost approximately $10,000, according to N. L. Etten, vice-president and general manager. Production of wringer rolls, which got underway recently, is expected to reach capacity in the next few months. The Chamberlain Corporation is a subsidiary of the American Wringer Co.

Tax Allowance Reduced

The Kelly-Springfield Tire Company, Cumberland, Md., which was originally allowed a Federal tax refund of $1,927,241, is only entitled to an over-allowance of $600,181, according to a ruling by Federal Judge Fake, Newark, N. J. Judge Fake first set the higher figure, but filed a new opinion setting the lower figure after the United States Circuit Court of Appeals ordered a rehearing.

TIRE PRICE STUDY NEARS COMPLETION

The study of the tire price situation, which started after the Procurement Division of the United States Treasury discarded identical bids submitted by fourteen tire manufacturers to furnish tires to the Government and awarded the contract for such tires to Sears, Roebuck and Company, is nearing completion and a report is expected in the early future. Because the tire industry is closer to the consumer than almost any other of the big industries, it is sensitive to anti-trust suspicion, according to John Love, noted financial writer, and this fact led to the study.

Although the rubber manufacturers are not particularly concerned with losing out on the Government's tire requirements since it has always been taken at the lowest price of any of the renewal business, there is some concern lest the study launched by the Government upset the price stability in the tire field, which has been maintained for more than two years, and bring back the price wars of 1931 and 1935.

Representative Dow Harter, of Akron, recently reprimanded the Department of Justice for its investigation of the tire price situation because of the alleged collusive bidding. He stated that collusive bidding was unlikely in the tire industry "because of the cut-throat competition," and also made the claim that "there is no commodity in common everyday use where you can get more for your money than in the purchase of automobile tires." Representative Harter also made the charge that another industry which recently submitted similar bids to a government department had the bids cancelled, and that new bids were requested and no investigation called for.

Adding Three Buildings

Construction is well advanced on three new buildings being added to the plant of the Viceroy Manufacturing Co., Ltd., West Toronto, Canada, one of the largest rubber manufacturers in the domain. The new buildings will add about 30,000 square feet to the company's plant, giving it a total area of approximately 137,000 square feet. The main addition is a four-story administration building, while the other two will be used for manufacturing purposes. The three additions, which are costing approximately $70,000, are expected to be ready for occupancy early in March.

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MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, JANUARY 11, 1938

Crude Rubber

BECAUSE the market developed into the usual year-end stalemate affair during the latter part of December, the price of spot rubber on the Exchange dropped consistently throughout the month since our last report. From a high of 15.48 on December 10, the price dipped to 14.54 by December 31. Limited activity in both actual and future markets and persistent selling by dealer interests contributed to the decline. A sharp break in price occurred over the New Year Holiday from 14.54 to 14.00 due to the announcement of price cuts in tires ranging from 3 to 12% by Sears-Roebuck and Montgomery-Ward. The price has been recovering, however, in the past 10 days, reaching 14.87 yesterday (December 10) due to better cables from abroad and speculative short covering on the belief that a further reduction in quotas will soon be decreed by the Restriction Committee in view of the lowered consumption outlook. This belief is given strength by a recent statement by the chairman of the Committee to the effect that "prices are considerably below the level the Committee considers desirable." Quotations in the outside market, Exchange, London and Singapore, follow:

As of January 11

Plantations—

Ribbed Smoked Sheets—			
No. 1 Spot	—	@	.14 11/16
February-March	—	@	.15
April-June	—	@	.15 1/16
No. 2	—	@	.14 15/16
No. 3	—	@	.13 15/16
No. 4	—	@	.13 3/16
Thin Latex Crepe	—	@	.15 1/16
Thick Latex Crepe	—	@	.15 1/16
Brown Crepe, No. 1	—	@	.13 3/4
Brown Crepe, No. 2	—	@	.13 5/8
Amber Crepe, No. 2	—	@	.13 3/4
Amber Crepe, No. 3	—	@	.13 5/8
Amber Crepe, No. 4	—	@	.13
Brown Crepe, Rolled	—	@	.11 1/16

Latex—

Normal, per lb., carload lots	—	@	.17 3/4

Paras—

Up-River, fine	—	@	.14 1/4
Acre Bolivian, fine	—	@	.14 1/4

Balata—

Surinam sheet	.35	@	.36

LONDON MARKET

Standard Smoked Sheets—Buyers—January 11

April-June	—	@	7 1/4d
July-September	—	@	7 5/8d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—January 11

April-June	—	@	6 7/8d
July-September	—	@	6 1/2d

Reclaimed Rubber

Reclaimers report a quiet market, but are agreed that conditions should pick up in the next month or two. Automobile production, now being launched on 1938 models, should help materially. There is a fair amount of supply available to meet any unexpected rush. No changes have occurred in the price structure since our last report. Current quotations follow:

Shoe

Unwashed	lbs.	.07	@	.07 1/4
Washed	lb.	.10	@	.10 1/2

Tube

No. 1 (Floating)	lb.	.14 1/2	@	.15
No. 2 (Compounded)	lb.	.09	@	.09 1/2
Red tube	lb.	.09	@	.09 1/2

Tires

Black (acid process)	lb.	.07 1/4	@	.07 1/2
Black, selected tires	lb.	.06 1/4	@	.06 1/2
Dark Gray	lb.	.09 3/4	@	.10
White	lb.	.13	@	.13 1/2
Truck, Heavy Gravity	lb.	.06	@	.06 1/2
Truck, Light Gravity	lb.	.07 1/2	@	.08

Miscellaneous

Mechanical blends	lb.	.04 1/2	@	.05

Scrap Rubber

(Delivered Akron Mills)

A quiet market prevails on scrap rubber, according to dealers, with some demand from the reclaimers. Stocks are said to be coming in slowly. Since our last report, prices have dropped slightly on beadless tire stock and increased slightly on boot and shoe stock. No further changes are anticipated at present. Current quotations follow:

(Prices to Consumers)

Auto tire peelings	ton	19.00	@20.00
Mixed auto	ton	13.50	@14.00
Beadless tires	ton	16.50	@17.25
Clean solid truck tires	ton	27.00	@29.00
Boots and shoes	ton	18.50	@20.00
Arctics, untrimmed	ton	16.00	@18.00
Inner tubes, No. 1	lb.	.10	@ .11
Inner tubes, No. 2	lb.	.04 1/2	@ .04 3/4
Inner tubes, Red	lb.	.04 1/2	@ .04 5/8

Cotton

Due to discounting of the large supply situation plus a return to the demand factor, which has been more or less dormant in the raw materials markets for several months, cotton prices started an upward trend early last month, a trend which is still continuing in the face of adverse business news. Were it not for further indicated decline in industrial production, the advance in prices would be made in greater jumps in the opinion of cotton experts. Since our last report the price has advanced 52 points. Low for the period was 8.17 on December 11; high was 8.72 today (January 11). The cotton market's steadiness is reported especially surprising in view of the difficulties being experienced in enacting a workable farm bill for next season's crop. In some quarters, this steadiness is attributed to the government's loan policy, which is apparently a more potent factor than had generally been believed. Foreign cotton markets have continued firm, thus leaving American cotton relatively the cheapest and therefore attracting considerable buying from abroad. Quotations for middling uplands on the Exchange follow:

	Dec. 9 Close	January 11 High	January 11 Low	January 11 Close
January	8.07	8.59	8.50	8.59
March	8.10	8.64	8.56	8.62
May	...	8.70	8.62	8.68

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb.	.28 3/4	@ .29
Peeler, carded, 23/4/3	lb.	.29 3/4	@ .30
Peeler, carded, 15/3/3	lb.	.26 3/4	@ .27
Peeler, carded, 13/3/3	lb.	.25 3/4	@ .26
Egyptian, carded, 23/5/3	lb.	.43	@ .43 1/4
Egyptian, combed, 23/5/3	lb.	.48	@ .48 1/4
CHAFERS			
Carded, American, 1 1/16"	lb.	.29	@ .29 1/2
Carded, American, 1"	lb.	.21 1/2	@ .25 1/2

Sheetings

48x40	36 in.	5.50 lb.	—	@ .03 3/4
40x40	36 in.	6.15 lb.	—	@ .03 3/4
40x36	36 in.	6.50 lb.	—	@ .03 1/4
48x48	40 in.	2.50 lb.	—	@ .07 3/4
48x48	40 in.	2.85 lb.	—	@ .06 5/8
56x60	40 in.	3.60 lb.	—	@ .06 1/4
48x54	40 in.	3.75 lb.	—	@ .05 1/4
44x40	40 in.	4.25 lb.	—	@ .05

Ducks

Enameling (single filling)	lb.	.20	@ .23
Belting and Hose	lb.	.25	@ —
Single filling, A grade	lb.	.09 3/4	@ .12 3/4
Double filling	lb.	.11 1/4	@ .13

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM DECEMBER 10 TO JANUARY 11

Date	Spot	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Sales
Dec. 10	15.48	15.48	15.57	15.64	15.72	15.77	15.83	15.86	15.90	15.95	16.00	16.05	16.10	——	112
11	15.37	15.38	15.47	15.54	15.62	15.68	15.75	15.80	15.85	15.90	15.95	16.00	16.05	——	22
12	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
13	15.18	15.20	15.23	15.32	15.40	15.46	15.52	15.57	15.63	15.68	15.73	15.78	15.83	——	125
14	15.00	15.00	15.00	15.09	15.17	15.24	15.27	15.40	15.45	15.50	15.55	15.60	15.65	——	238
15	14.93	14.95	15.00	15.07	15.15	15.22	15.29	15.34	15.39	15.43	15.47	15.52	15.57	——	141
16	15.13	15.14	15.14	15.24	15.33	15.38	15.43	15.48	15.53	15.58	15.64	15.69	15.74	——	156
17	15.06	15.05	15.05	15.15	15.25	15.30	15.36	15.40	15.45	15.51	15.57	15.62	15.67	——	50
18	15.00	15.01	15.01	15.10	15.20	15.26	15.33	15.37	15.42	15.47	15.52	15.57	15.62	——	37
19	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
20	15.00	14.96	14.96	15.06	15.17	15.22	15.28	15.34	15.40	15.48	15.56	15.61	15.66	——	138
21	15.18	15.18	15.18	15.29	15.40	15.44	15.49	15.55	15.62	15.67	15.73	15.79	15.85	——	269
22	15.09	15.09	15.09	15.19	15.29	15.33	15.38	15.43	15.48	15.53	15.58	15.63	15.69	——	81
23	14.96	14.96	14.95	15.05	15.15	15.20	15.26	15.32	15.38	15.42	15.46	15.51	15.56	——	103
24	15.12	15.12	15.12	15.21	15.30	15.36	15.41	15.46	15.51	15.56	15.61	15.66	15.71	——	79
25	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
26	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
27	14.96	14.96	14.96	15.06	15.17	15.21	15.26	15.31	15.36	15.41	15.46	15.51	15.56	——	73
28	14.76	14.78	14.78	14.86	14.94	14.99	15.04	15.09	15.14	15.19	15.24	15.29	15.34	——	209
29	14.44	——	14.44	14.52	14.60	14.65	14.69	14.74	14.78	14.83	14.88	14.93	14.98	——	482
30	14.53	——	14.53	14.63	14.73	14.79	14.86	14.90	14.95	15.00	15.05	15.10	15.15	——	241
31	14.54	——	14.54	14.61	14.68	14.72	14.75	14.81	14.85	14.90	14.95	15.00	15.05	——	393
Jan. 1	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
2	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
3	14.00	——	14.00	14.10	14.19	14.25	14.31	14.36	14.42	14.47	14.52	14.57	14.62	14.67	237
4	14.20	——	14.17	14.26	14.35	14.40	14.45	14.51	14.57	14.62	14.67	14.72	14.77	14.82	304
5	14.30	——	14.25	14.34	14.43	14.47	14.52	14.58	14.65	14.70	14.75	14.80	14.85	14.90	258
6	14.43	——	14.40	14.47	14.53	14.59	14.65	14.69	14.73	14.78	14.83	14.88	14.93	14.98	203
7	14.44	——	14.42	14.49	14.56	14.61	14.66	14.71	14.76	14.82	14.89	14.94	14.99	15.04	137
8	14.37	——	14.30	14.42	14.53	14.59	14.64	14.70	14.76	14.80	14.85	14.90	14.95	15.00	268
9	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
10	14.87	——	14.83	14.93	15.03	15.09	15.16	15.21	15.27	15.32	15.38	15.43	15.48	15.53	477
11	14.74	——	14.70	14.80	14.90	14.99	15.05	15.14	15.20	15.26	15.31	15.36	15.41	15.46	204

Rubber CHEMICAL Markets

NEW YORK, JANUARY 11, 1938 [All Quotations F.O.B. Works Unless Otherwise Noted]

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.26 @	—
A-5-10	lb.	.34 @	—
A-11	lb.	.57 @	—
A-19	lb.	.57 @	—
A-32	lb.	.72 @	—
A-77	lb.	.47 @	—
A-100	lb.	.47 @	—
A-433	lb.	.50 @	—
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	— @	—
Captax	lb.		
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.44 @	.46
Diphenylguanidine	lb.	.35 @	.36
El-Sixty	lb.	.57 @	—
Ethylidene aniline	lb.	.45 @	.47½
Formaldenyde aniline	lb.	.37½ @	.42
Guantal	lb.	.45 @	—
Heptene	lb.	.40 @	—
Hexamethylenetetramine	lb.	.36 @	—
Lead Oleate, No. 999	lb.	.12 @	—
Witco	lb.	.12 @	—
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.36 @	.37
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	—
Phenex	lb.	.50 @	.55
Pip-Pip	lb.	2.50 @	—
Pipsolene	lb.	1.75 @	—
R & H 40	lb.	.40 @	.41
R & H 50	lb.	.40 @	.41
R-2	lb.	1.65 @	—
R-23	lb.	.57 @	—
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Thiocarbanilid, drums	lb.	.26 @	—
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.60
Tuads	lb.		
Ureka	lb.	.65 @	—
Ureka Blend B	lb.	.65 @	—
Ureka C	lb.	.60 @	—
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z-88-P	lb.	.51 @	—
Zimate	lb.		
Inorganic			
Litharge, domestic	lb.	.06½ @	.07¾
Magnesia, calcined, heavy	lb.	.04 @	—

COLORS

Blacks (See Compounding Materials)			
Blues			
Prussian	lb.	.36 @	.37
Ultramarine	lb.	.15 @	—
Browns			
Mapico	lb.	.13 @	—
Umber, Turkey	lb	.04 @	.04½
Greens			
Chrome	lb.	.21 @	—
Chromium Oxide, bbl.	lb.	.21 @	—
Guignet's Green	lb.	.70 @	—
Reds			
Antimony			
crimson, 15/17	lb.	.48 @	—
sulfur, free	lb.	.48 @	.60
Indian English	lb.	.09 @	.10
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼ @	—
Whites			
Cryptone, No. 19	lb.	.05⅞ @	.06⅛
Cryptone CB, No. 21	lb.	.05⅞ @	.06⅛
Cryptone, ZS-20	lb.	.09 @	.09¼
Cryptone, ZS-86	lb.	.09 @	.09½
Lithopone			
Albalith, black label—11	lb.	.04⅜ @	.04⅝
Azolith	lb.	.04⅜ @	.04⅝
Rayox	lb.		
Titanox A	lb.	.16 @	.16¾
Titanox B	lb.	.05⅞ @	.06⅛
Titanox C	lb.	.05⅞ @	.06⅛
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.06¼ @	.06½
Anaconda, lead free	lb.	.06¼ @	.06½
Horsehead Lead Free Brand:			
Special—3	lb.	.06¼ @	.06½
XX Red—4	lb.	.06¼ @	.06½
XX Red—72	lb.	.06¼ @	.06½
XX Red—78	lb.	.06¼ @	.06½
XX Red—103	lb.	.06½ @	.06¾
Kadox, black label—15	lb.	.06½ @	.06¾
Blue label—16	lb.	.06½ @	.06¾
Red label—17	lb.	.06½ @	.06¾
St. Joe, black label	lb.	.06¼ @	.06½
green label	lb.	.06¼ @	.06½
red label	lb.	.06¼ @	.06½
U S. P.—7, bbls.	lb.	.09 @	.09¼
Zinc Oxide—French Process			
Florence White seal—7 bbls.	lb.	.08½ @	.08¾
Green seal—8	lb.	.08 @	.08¼
Red seal—9	lb.	.07½ @	.07¾
Yellows			
Cadmolith	lb.	.61 @	—
Chrome	lb.	.14½ @	.15½
Mapico	lb.	.09½ @	—

BLACKS

Arrow "Aerfloted" Specification	lb.	.0435 @	.0775
Bone, powdered	lb.	.05½ @	.1[illegible]
Carbon, compressed	lb.	.0435 @	.0775
uncompressed	lb.	.0435 @	.0775
"Certified"	lb.	.0410 @	.0775
Spherons	lb.	.0410 @	.0775
"Disperso"	lb.	.0435 @	.0775
Drop, bbls.	lb.	.05½ @	.14
"Excello," compressed	lb.	.0435 @	.0775
"Fumonex"	lb.	.03 @	.07
"Gastex"	lb.	.03 @	.07
Lampblack	lb.	.07 @	.12
"Micronex"	lb.	.0435 @	.0775
"Supreme"	lb.	.0435 @	.0775
Thermatomic—"P 33"	lb.	— @	—
"Thermax"	lb.	— @	—
United "Dixie" & "Kosmos"	lb.	.0435 @	.0775

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85 @	24.50
Ammonia carbonate, lump	lb.	.10½ @	.12
Asbestine	ton	13.00 @	15.00
Barium carbonate (98-100%)	ton	52.50 @	57.50
Barium Dust	lb.	.05 @	.06
Barytes	ton	23.65 @	31.15
Basofor	lb.	.04½ @	—
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	60.00 @	65.00
Calcene	ton	37.50 @	45.00
Cataipo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	45.40 @	60.00
heavy	ton	45.00 @	55.00
Clay, Kaolin, domestic	ton	7.50 @	15.00
Aerfloted, Suprex	ton	9.00 @	21.00
Congaree	ton	9.00 @	—
Crown (f.o.b. plant)	ton	9.00 @	—
Dixie	ton		
Dixie, Jr.	ton		
McNamee	ton		
Par	ton		
Tensulite		15.00 @	—
Witco	ton	8.50 @	9.00
Cotton Flock	lb.	.11 @	.15
Glues, extra white	lb.	.28 @	.30
medium white	lb.	.14 @	19
Kalite No. 1	ton	— @	—
Kalite No. 3	ton	— @	—
"Lime Crest" Industrial Filler No. 100	lb.	— @	—
Magnesium carbonate	lb.	.07½ @	—
Mica	ton	35.00 @	44.00
Pyrax A	ton	— @	—
Rottenstone (powdered)	lb.	.02½ @	.05
Soapstone, powdered	ton	16.00 @	22.00
Starch, powdered	cwt.	2.90 @	4.10
Talc, domestic	ton	17.00 @	20.00
Whiting, commercial	ton	17.00 @	18.00
Columbia Filler	ton	9.00 @	14.00
English Cliffstone	ton	33.00 @	43.00
Witco	ton	7.00 @	—
Wood Flour	ton	20.00 @	25.00
Zinc Carbonate	lb.	— @	.10¾
Zinc Stearate	lb.	— @	.27

MINERAL RUBBER

Black Diamond	ton	27.00 @	—
Genasco, solid (factory)	ton	25.00 @	27.00
Hard Hydrocarbon	ton		
Parmr, solid	ton	25.00 @	—
Pioneer, MR, solid	ton		
Pioneer-granulated	ton		

MISCELLANEOUS

Aromatics—Rodo	lb.		
Curodex 19	lb.	2.75 @	—
Curodex 188	lb.	3.50 @	—
Curodex 198	lb.	4.50 @	—
Para-Dors No. 5145	lb.	2.00 @	—
Areskleno No. 375 (dispersing, wetting and penetrating agent)	lb.	.40 @	—
Santomerse (dispensing, wetting, penetrating and stabilizing agent)	lb.	.13 @	—
Sunproof	lb.	.35 @	.37½
Sponge Paste	lb.	— @	.80
Tackol (tackifier)	lb.	.115 @	—
Tonox	lb.	.56 @	.60

SOFTENERS

Acids			
Acetic, 28%, bbls.	100 lb.	2.53 @	2.78
Nitric, 36 degrees	cwt.	5.00 @	6.00
Sulfuric, 66 degrees	ton	15.50 @	16.50
Acids, Fatty			
Laurex	lb.	.15 @	.16
Stearex Beads	lb.	.10¾ @	.11¼
Stearic, double pressed	lb.	.12½ @	.13½
Stearite	lb.	.10½ @	.11¼
Alkalies			
Caustic Soda, 76%	cwt.	3.15 @	3.80
Soda Ash, 58%, C.L.	cwt.	— @	2.35
Oils			
Cycline Oil	gal.	.20 @	—
Degras, bbls.	lb.	.07¾ @	.08
Fluxrite	lb.	.05½ @	.06½
Palm Niger	lb.	.05½ @	.06½
Para-Flux	gal.	.17 @	—
Petrolatum, light	lb.	.03½ @	.03½
Pigmentaroil, tank cars	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
Pine, steam distilled	gal.	.64 @	.69
dest. dist., drums	gal.	.49 @	.50
Rosin Oil, cmpd	gal.	.40 @	—
Rubberol, f.o.b. Chicago	lb.	.13½ @	.14
Rubtack	lb.	.08 @	.10
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	.07 @	—
Witco Softener No. 20	gal.	.20 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Wobonite, c.l.	lb.	.05 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.05½ @	.06½
coal tar	ton	19.00 @	22.00
hardwood	ton	16.00 @	22.50
pine, 200 lb. gr. wt.	bbl.	6.00 @	6.50
Pigmentar, tank cars	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
R. S. L. Resin	lb.	— @	—
Retort Pine Tar, drums	ton	20.00 @	26.00
Solvents			
Acetone, pure	lb.	— @	.06¼
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.33 @	.39
Benzene, 90%	gal.	.18 @	.23
Beta-Trichlorethane	gal.	— @	.20
Bondogen	lb.	— @	—
Carbon, bisulfide	lb.	.05¼ @	.08
Carbon tetrachloride	lb.	.05¾ @	.08¼
Dichlorethylene	lb.	— @	.25
Dipentene, cml., drums	gal.	.41 @	.50
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Ethylene dichloride	lb.	.05½ @	.06¼
Plastogen	lb.		
Reogen	lb.		
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Trichlorethylene	lb.	— @	.09½
Turpentine, spirits	gal.	.43 @	.47
dest. dist., drums	gal.	.33 @	.41
Waxes			
Beeswax, white	lb.	.39 @	.45
Carnauba, yellow	lb.	.46 @	.47½
Ceresin, white, dom.	lb.	.08 @	.11
Montan, crude	lb.	.10¾ @	.11¼
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale	lb.	.02¾ @	—
White crude scale 124/126	lb.	.02¾ @	.03
Refined, 122/127	lb.	.04½ @	—

ANTI-OXIDANTS

AgeRite, Gel	lb.		
HP	lb.		
Powder	lb.		
Resin	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Flectol H	lb.	.54 @	—
Flectol White	lb.	1.00 @	—
Flectol B	lb.	.54 @	—
Neozone	lb.		
Oxynone	lb.	.68 @	—
Perflectol	lb.	.67 @	.75
Retardex	lb.	.35 @	.40
Santoflex A	lb.	— @	—
Santoflex B	lb.	.54 @	—
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.60

MOLD LUBRICANTS

Aresklene	lb.	— @	—
Cocoa Soapstock	lb.	.06 @	.08
Dipex	lb.	.06 @	.08
Lubrex	lb.	.25 @	.30
Mold Paste	lb.	.18 @	—
Rubberol, f.o.b. Chicago	lb.	.13½ @	.14
Rusco, f.o.b. Nitro	lb.	.25 @	.30
Sericite, f.o.b. N. Y.	ton	65.00 @	—
Soap Tree Bark, cut, sifted	lb.	.06 @	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.20 @	—
Black	lb.	.07¾ @	.13½
White	lb.	.095 @	.15
Brown	lb.	.095 @	.14
Neophax	lb.	.13 @	—

VULCANIZING INGREDIENTS

Sulfur Chloride, yellow (drs.)	lb.	.04½ @	—
Sulfur flour.			
Refined, 100% pure (bags)	cwt.	2.55 @	3.65
Commercial (bags)	cwt.	1.60 @	2.35
Telloy	lb.		
Vandex	lb		

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Total Declared Value	Average Declared Value per pound Cents	Re-exports: Long Tons	Total Declared Value	Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,362	185,060,304	26.71	8,772	5,672,319	28.87	300,590
1924	325,899	173,367,272	23.75	10,309	6,057,637	26.23	315,590
1925	393,370	426,167,504	48.36	14,827	19,847,753	59.76	378,543
1926	409,944	501,131,064	54.57	17,671	22,470,583	56.77	392,273
1927	424,733	338,688,492	35.60	27,775	24,735,488	39.76	396,958
1928	432,633	242,727,423	25.05	32,159	18,128,761	25.17	400,474
1929	560,082	239,177,811	19.06	36,485	16,868,718	20.64	523,597
1930	482,083	139,133,048	12.88	30,205	9,310,205	13.76	451,878
1931	497,176	72,922,845	6.55	25,595	4,255,572	7.42	471,581
1932	409,556	31,936,459	3.48	20,930	2,015,612	4.30	388,626
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	387,280
1934	449,513	97,929,676	9.73	23,848	5,770,109	10.80	425,665
1935	453,134	115,299,448	11.36	11,389	3,084,331	12.09	441,745
1936	467,064	152,072,496	14.54	12,581	4,488,223	15.93	454,483
1936:							
Apr.*	44,218	13,967,712	14.10	984	343,785	15.59	43,234
May*	35,578	11,460,157	14.38	1,589	580,021	16.30	33,989
June	36,376	12,073,632	14.82	2,469	904,669	16.35	33,907
July	38,178	12,763,200	14.92	1,383	510,075	16.47	36,795
Aug.	40,027	13,364,916	14.91	840	307,114	16.32	39,187
Sept.*	48,368	16,691,919	15.41	656	244,554	16.64	47,712
Oct.	39,573	13,627,465	15.37	778	268,645	15.42	38,795
Nov.*	36,798	12,790,306	15.52	675	241,982	15.99	36,123
Dec.	49,312	17,555,705	15.89	677	267,745	17.65	48,635
1937:							
Jan.	42,002	15,408,242	16.38	844	372,053	19.69	41,158
Feb.	42,743	16,470,867	17.20	523	236,853	20.21	42,220
Mar.	38,682	16,030,267	18.50	1,146	522,931	20.37	37,536
Apr.	41,275	17,859,223	19.31	1,050	415,484	17.66	40,225
May	46,902	22,163,440	21.10	528	270,499	21.08	46,374
June	47,073	22,559,545	21.39	807	390,542	21.60	46,266
July	41,493	19,010,273	20.45	767	300,301	17.48	40,726
Aug.	48,020	20,595,314	19.15	670	265,298	17.69	47,350
Sept.	55,123	22,119,248	17.91	668	280,741	18.76	54,455
Oct.	51,171	20,250,893	17.67	450	172,466	17.13	50,721
Nov.	51,958	19,905,523	17.01	159	66,501	18.72	51,799

* Revised.

Note: Annual figures for 1922-1936 revised on basis of information received on February 8, 1937. Figures for 1922 and 1923 include latex; guayule is included only in 1922.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Liquid Latex (1) Tons	Liquid Latex (1) Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,272	3,537,510
1926	4,305	2,362,096	354	327,213	7,263	3,127,757	3,394	4,686,743
1927	5,018	2,674,957	582	477,246	7,785	2,448,657	1,495	1,170,650
1928	3,077	1,755,685	731	430,855	7,552	2,540,059	4,007	2,121,786
1929	1,275	545,175	728	566,964	8,204	2,458,126	3,729	1,788,391
1930	1,096	347,388	502	422,684	5,907	1,403,244	4,458	1,508,786
1931	....	.....	1,207	411,380	5,777	1,019,010	4,675	888,909
1932	....	.....	707	147,403	4,607	616,596	5,112	601,999
1933	....	.....	1,659	2,261,869	5,990	944,895	11,085	1,833,671
1934	398	75,349	1,054	438,209	4,987	943,752	13,107	3,643,221
1935	459	86,835	615	188,384	5,644	1,063,126	13,553	3,782,222
1936	1,229	286,552	535	199,368	6,163	1,296,364	19,852	6,659,899
1936:								
Nov.	159	43,980	43	19,408	405	91,538	1,631	578,729
Dec.	134	36,972	14	7,247	538	109,208	2,070	735,156
1937:								
Jan.	160	44,166	10	4,348	247	56,056	1,337	535,546
Feb.	206	56,807	14	5,838	242	61,741	1,973	775,202
Mar.	136	37,453	29	13,949	898	187,413	2,216	968,053
Apr.	190	52,361	3	1,457	617	135,412	1,633	724,757
May	182	50,093	75	33,881	642	145,618	1,995	941,235
June	147	39,941	91	41,481	488	135,468	2,561	1,253,370
July	371	106,360	22	9,363	533	158,998	1,921	924,127
Aug.	335	95,893	16	5,876	363	107,611	1,801	838,778
Sept.	329	90,822	5	2,196	701	214,511	1,901	839,159
Oct.	247	68,178	29	12,090	460	149,516	1,958	844,205
Nov.	251	69,452	29	9,374	593	194,889	2,085	875,074

(1) Weight given in pounds of dry rubber contained in latex.

Note: Annual figures for 1924-1936 revised on basis of information received on February 8, 1937.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

(All Quantities in Long Tons)

	1930	1931	1932	1933	1934	1935	1936*	1937
	Figures on Monthly Basis							
Jan.	36,194	28,557	29,648	22,645*	39,190*	46,636*	48,631	50,818*
Feb.	33,302	28,797	31,821	21,392*	40,515*	42,720*	36,841	51,887*
Mar.	35,540	32,788	29,505	17,483*	47,003*	42,153*	42,813	54,064*
Apr.	39,686	33,321	27,518	25,928	44,853*	44,247*	52,031	51,797
May	39,386	37,817	30,957	44,074	42,918*	41,101*	50,612	51,733
June	34,195	37,916	41,475	50,743*	40,147*	36,156*	52,772	51,798
July	29,508	31,397	29,976	49,614*	32,553*	35,917*	48,250	43,650
Aug.	30,850	27,586	23,721	44,428*	33,216*	38,775*	46,777	41,456
Sept.	25,515	23,638	23,847	35,281*	30,258*	37,086*	46,449	43,893
Oct.	27,516	22,277	22,286	31,543*	31,253*	41,969*	49,637	38,707
Nov.	23,691	22,943	23,231	28,831*	34,748*	42,310*	50,433	33,984
Dec.	21,687	21,409	18,015	28,757*	36,569*	42,474*	49,754	.....
Tot.	375,980	348,986	332,000	400,719*	453,223*	491,544*	575,000	.....

* Revised.

Note: Figures for 1936 were revised on May 15, 1937, and are now based on Department of Commerce survey figures.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks[a]
1927	189,144	178,471	47.6	24,980
1928	208,516	223,000	50.4	24,785
1929	218,954	226,589	48.4	27,464
1930	157,967	153,497	40.8	22,00(
1931	133,351	124,126	33.9	19,257

Year	Production	Consumption Tons	Consumption % to Crude	Stocks[a]
1932	75,608	77,504	23.4	16,354
1933	99,560	81,602	19.9	20,746
1934	110,010	100,597	22.2	23,079
1935	122,948	113,078*	23.0*	25,069
1936	150,571	141,486*	24.6*	19,000*

	Production	Consumption Tons	Consumption % to Crude	Stocks[a]		Production	Consumption Tons	Consumption % to Crude	Stocks[a]
	Figures on Monthly Basis								
1936*:									
Jan.	11,665	10,922	22.5	17,171	July	12,330	12,856	26.6	16,207
Feb.	10,188	8,014	21.8	18,890	Aug.	12,656	11,959	25.6	16,487
Mar.	10,712	9,539	22.3	19,472	Sept.	12,959	12,153	26.2	16,711
Apr.	11,382	11,241	21.6	19,024	Oct.	14,737	13,715	27.6	17,141
May	11,512	11,311	22.3	18,590	Nov.	14,357	13,087	25.9	17,900
June	11,935	12,563	23.8	17,366	Dec.	15,938	14,126	28.4	19,000
1937:									
Jan.*	15,129	14,450	28.4	18,822	July	17,885	11,924	27.3	16,646
Feb.*	15,192	14,578	28.1	18,490	Aug.	15,289	14,670	35.4	18,299
Mar.*	14,462	15,601	28.9	16,450	Sept.	16,410	13,681	37.4	21,597
Apr.	13,884	15,607	30.1	14,046	Oct.	15,849	12,234	31.6	23,572
May	15,793	14,693	28.4	14,647	Nov.	12,406	9,703	28.6	24,620
June	16,052	14,414	27.8	14,535	Dec.	.....	.....	...	.....

[a] Stocks on hand at the end of month or year.

* Revised.

Note: Figures for 1936 were revised on June 1, 1937, and are now based on Department of Commerce survey figures.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)

(In Thousands of Barrels of 42 Gallons)

	1935*	1936*	1937		1935*	1936*	1937
January	28,147	32,344	33,696	August	43,097	46,061	49,597
February	26,580	27,178	32,000	September	37,976	44,366	47,245
March	32,272	35,864	40,561	October	41,566	44,163	45,361
April	36,363	38,864	43,409	November	35,991	39,954	
May	39,381	42,010	45,484	December	33,872	39,590	
June	38,086	44,522	48,580				
July	41,479	46,865	50,929	Total	434,810	481,606	

* Revised.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1925	26,001,664	1929	24,141,502	1933	8,713,962
1926	24,199,524	1930	17,364,096	1934	12,255,118
1927	19,700,003	1931	11,253,800	1935	18,664,356
1928	24,247,282	1932	6,261,336	1936	20,790,098

1937:		1937:		1937:	
January ...	2,123,723	May	2,189,502	September .	1,470,472
February ..	2,022,258	June	2,141,810	October ...	1,890,082
March	2,166,218	July	1,702,105	November ..	1,818,169
April	2,269,680	August	1,342,945	December ..	1,121,018

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—New York Market, in Cents per Pound

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1935																																
November	13¼	13⅛		13⅛		13¼	13⅜	13⅛	13¼				13⅛	13⅜	13⅛	13⅜	14⅛	14⅛	13	14⅜	14½		13⅛	13⅛	13¼	13⅛	13⅜		14⅛	13⅛		13 11/16
December	13⅛	12¾	12¾	12⅞	13	13⅛	13⅜		13	12⅛	13	13	13	13⅜		13⅜	13⅜	13⅜	13¼	13¼	13¼	22⅛	23	13¼	13¼	13⅛	13⅜	13⅜	13⅛	13⅛	13⅛	13 13/16
1936																																
January	13½	13⅜	13⅜	13⅜		13¾	13⅛	13⅛	13⅜		14⅛	13⅞	13⅞	14⅛	13⅞	14⅛	14⅛	14⅜	13	14⅜	14½	14⅜	14⅛	15	15	15⅛	15⅛	14⅛	14⅛	14⅛	14⅛	14 5/16
February	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅜	13⅛	13⅛	12⅛	13	13	13⅛	13⅜	13⅛	13⅜	13⅜	13⅜	13¼	13¼	13¼	14⅛	14⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13 15/16
March	15⅛	15⅛	15⅜	15⅛	15⅜	15⅛	15⅛	15⅛	15⅛	16	16	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅜	16	16	15⅛	16	16	16	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15 15/16
April	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛
May	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛
June	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜
July	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛
Aug.	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛
Sept.	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛
Oct.	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛
Nov.	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16⅛
Dec.	18⅛	18⅛	18⅛	19	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛
1937																																
Jan.	21	21⅛	20⅜	21⅛	21⅛	21⅛	21⅛	21⅛	22⅛	21½	22⅜	22⅛	22	21⅛	21⅛	21⅛	21⅛	21⅛	20⅛	21⅛	20⅛	21⅛	20⅜	20⅜	20⅜	20⅜	20⅜	21⅛	21⅛	21⅛	21⅛	21⅜
Feb.	21⅛	21⅛	21⅛	21⅛	21⅛	21½	21⅛	21½	21¼	21⅛	23⅜	23⅛	23⅜	23⅛	23⅜	23⅜	24⅛	24⅛	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24⅜	24 5/16
Mar.	26⅛	26⅛	26⅛	26⅛	26⅛	23⅜	24⅛	24⅛	24⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	22⅛	22⅛	22⅛	22⅛	22⅛	22⅛	22⅛	22⅛	22⅛	22⅛	22⅛	22⅛	22⅛	22⅛	22⅛	22⅛	24 7/16
April	26⅛	26⅛	26⅛	26⅛	26⅛	23⅛	23⅛	24⅛	24⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛	23⅛
May	21	21	21	21⅛	21½	21⅛	21⅛	22⅛	22⅛	21⅛	21⅛	21½	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛	21⅛
June	20⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	18⅛	18⅛	18⅛	18⅛	19	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛
July	19⅜	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	19⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛
Aug.	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛	18⅛
Sept.	18⅛	18⅛	18⅛	17⅜	17⅜	17	14⅛	15⅛	15⅛	16⅜	14⅛	14⅛	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜
Oct.	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜
Nov.	15⅛	15⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛
Dec.	15	15⅛	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½
1938																																
Jan.	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛	14⅛

Average Spot Closing Prices— Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1929

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15	1922	17.50	1926	48.50
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55

Average Monthly Price per Pound Since 1930

	1930 Cents	1931 Cents	1932 Cents	1933 Cents	1934 Cents	1935 Cents	1936 Cents	1937 Cents
Jan.	15.24	8.34	4.38	3.08	9.32	13.10	14.35	21.37
Feb.	15.85	7.70	4.03	2.95	10.45	12.92	15.48	21.33
Mar.	15.34	7.71	3.35	3.01	11.01	11.51	15.89	24.09
Apr.	14.93	6.43	3.02	3.56	12.10	11.55	15.98	23.44
May	14.24	6.49	3.09	4.95	13.26	12.05	15.62	21.14
June	12.45	6.35	2.66	6.15	13.51	12.57	15.85	19.29
July	11.24	6.37	2.89	8.01	14.60	12.10	16.49	18.86
Aug.	9.96	5.38	3.63	7.31	15.47	11.98	16.25	18.37
Sept.	8.28	5.08	3.84	7.30	15.36	11.55	16.46	18.55
Oct.	8.20	4.87	3.65	7.64	13.96	12.62	16.55	16.28
Nov.	9.01	4.65	3.44	8.66	13.04	13.15	17.97	14.60
Dec.	9.05	4.64	3.24	8.87	12.98	13.28	20.01	15.41
Average for Year	11.98	6.17	3.49	5.96	12.92	12.37	16.41	19.39

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	1937 Oct.	1937 Nov.	1937 Dec.	1938 Jan.	Day	1937 Oct.	1937 Nov.	1937 Dec.	1938 Jan.
1	8	7	7		17		7	7	
2	8	7	7		18	7	7	7	
3		7	7		19	7	6		
4	8	7	7		20	7	6	7	
5	8	7			21	7		7	
6	7	7	7		22	7	6	7	
7	8		7		23	7	6	7	
8	8	6	7		24		7	7	
9	8	6	7		25	7	7		
10		7	7	7	26	7	7		
11	8		7		27	7	7		
12	7	7			28	7		7	
13	7	7	7		29	7	6	6	
14	8		7		30	7	7	7	
15	7	7	7		31			6	
16	7	7	7						

Average Monthly Price Per Pound

Month	1934 Pence	1935 Pence	1936 Pence	1937 Pence	Month	1934 Pence	1935 Pence	1936 Pence	1937 Pence
Jan.	4.429	6.434	6.758	10.378	Aug.	7.401	5.696	7.581	8.830
Feb.	4.920	6.292	7.255	10.503	Sept.	7.409	5.508	7.577	8.935
Mar.	5.136	5.745	7.450	11.766	Oct.	6.806	6.130	7.898	7.855
Apr.	5.712	5.604	7.502	11.471	Nov.	6.294	6.308	8.572	7.080
May	6.207	5.822	7.335	10.250	Dec.	6.295	6.340	9.580	7.332
June	6.245	6.027	7.352	9.548	Average for				
July	7.053	5.801	7.696	9.136	Year	6.159	5.976	7.713	9.424

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	1937 Nov.	1937 Dec.	1938 Jan.	Date	1937 Nov.	1937 Dec.	1938 Jan.	Date	1937 Nov.	1937 Dec.	1938 Jan.
1	8.03	8.00		11		8.17	8.72	22	7.90	8.48	
2		8.06		12	8.13			23	7.99	8.44	
3	7.81	8.08	8.38	13	8.00	8.21		24	7.99	8.43	
4	7.79	8.01	8.46	14		8.32		25			
5	7.89		8.48	15	7.93	8.29		26	8.12		
6	7.85	8.03	8.58	16	7.95	8.37		27	8.22	8.42	
7		7.97	8.58	17	7.86	8.31		28		8.40	
8	7.97	8.08	8.59	18	7.83	8.32		29	8.10	8.29	
9	8.00	8.20		19	7.84			30	8.04	8.35	
10	8.01	8.22	8.69	20	7.91	8.46		31		8.38	
				21		8.51					

Average Monthly Price Per Pound

	1934 Cents	1935 Cents	1936 Cents	1937 Cents		1934 Cents	1935 Cents	1936 Cents	1937 Cents
Jan.	11.25	12.70	11.91	13.06	Aug.	13.40	11.48	12.28	10.41
Feb.	12.28	12.58	11.53	13.15	Sept.	13.00	10.80	12.31	9.02
Mar.	12.30	11.63	11.43	14.46	Oct.	12.48	11.28	12.30	8.42
Apr.	11.80	11.73	11.71	14.23	Nov.	12.53	12.01	12.23	7.96
May	11.44	12.25	11.68	13.34	Dec.	12.76	11.99	12.83	8.26
June	12.20	11.89	12.02	12.70	Average for				
July	12.84	12.26	13.11	12.26	Year	12.36	11.88	12.11	11.44

World Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND 1935	ON HAND 1936	ON HAND 1937	AFLOAT 1935	AFLOAT 1936	AFLOAT 1937	ON HAND AND AFLOAT 1935	ON HAND AND AFLOAT 1936	ON HAND AND AFLOAT 1937
Jan.	349,446	285,054*	201,915	42,066	43,870	55,096	391,512	328,924*	257,011
Feb.	340,264	282,902*	193,864	42,969	46,532	53,538	383,233	329,434*	247,402
Mar.	340,284	276,823*	191,928*	44,485	58,935	56,994	384,769	335,758*	248,922*
Apr.	337,586	277,478*	174,934	37,651	47,678	72,530	375,237	325,156*	247,464
May	322,558	262,415*	172,985	44,375	48,860	58,542	366,933	311,275*	231,527
June	324,218	245,544*	169,646	55,581	47,228	57,215	379,799	292,782*	226,861
July	334,692	235,850*	164,445	49,018	60,343	75,779	383,710	296,193*	240,224
Aug.	334,106	230,167*	171,052	47,724	63,597	80,439	381,830	293,764*	251,491
Sept.	331,121	233,336*	182,556	43,413	62,240	83,288	374,534	295,576*	265,844
Oct.	322,857	224,000*	195,685	49,913	67,825	80,653	371,770	291,825*	276,338
Nov.	308,993	211,480*	217,586	46,588	73,691	81,302	355,581	285,171*	298,888
Dec.	303,000	218,844		39,094	56,567		342,094	275,411	

(Rubber Manufacturers' Association figures raised to 100%)

* Revised.

Note: Complete figures for 1934 and 1935 were revised by the R.M.A. on May 1, 1936.

STOCKS IN GREAT BRITAIN

(No. of Tons in Wharves and Warehouses, not including Latex)

At end of	London 1935	London 1936	London 1937	Liverpool 1935	Liverpool 1936	Liverpool 1937
January	81,807	84,791	29,005	66,405	77,188	41,895
February	87,605	79,757	26,508	67,983	77,138	37,078
March	92,664	74,779	21,292	69,218	72,823	30,622
April	94,361	68,932	21,128	70,584	71,388	27,443
May	95,722	61,349	21,351	71,927	69,150	25,081
June	98,077	55,993	21,964	73,131	66,173	21,258
July	99,226	49,575	22,589	74,915	63,715	19,424
August	101,574	45,749	25,211	75,584	62,367	19,817
September	101,198	44,364	28,462	76,263	59,485	21,190
October	94,749	40,777	30,465	76,400	55,738	21,327
November	90,542	37,495	33,304	76,301	51,184	21,399
December	86,551	33,027		77,589	45,291	

(Figures from the Rubber Trade Association of London)

STOCKS IN OTHER CENTRES

(Figures from Statistical Bulletin of the Int'l Rubber Regulation Committee)

	Penang and Singapore [1]	Malaya [2]	Ceylon [2]	Holland	Para and Manaos
At end of 1936					
December	26,969	35,145	5,161	409	2,454
At end of 1937					
January	36,365	41,911	5,024	290	4,005
February	42,132	44,346	5,855	197	3,763
March	42,485	40,317	3,477	108	4,078
April	38,812	38,443	3,745	101	3,840
May	34,234	40,253	3,781	94	3,559*
June	45,085	48,545	4,558	98	1,019
July	44,776	43,270	3,725	124	1,050
August	47,886	44,775	4,454	144	1,133
September	49,448	38,131	5,294	135	1,543
October	41,965	43,900	4,743	117	1,780

[1] Dealers' and Port Stocks. [2] Inside Regulated Areas. [3] Dealers' Stocks Only.
* Revised.

RUBBER STOCKS AFLOAT

	Afloat for United States	Afloat for Europe	All Other * Afloat	Total * Afloat
End of: 1936:				
November	73,691	19,270	13,039	106,000
December	56,567	24,800	21,633	103,000
End of: 1937				
January	55,096	24,920	17,984	98,000
February	53,538	27,250	13,212	94,000
March	56,994	31,240	36,766	125,000
April	72,530	34,410	17,060	124,000
May	58,542	31,500	26,958	117,000
June	57,215	34,700	33,085	125,000
July	75,779	45,100	23,121	144,000
August	80,439	40,300	19,261	140,000
September	83,288	37,400	20,312	141,000
October	80,653	35,000P	19,347	135,000
November	81,302	30,000P	14,698	126,000

* *Total Afloat* is an arbitrary estimate based on 1½ months' shipments as adopted by the Department of Commerce. *All Other Afloat* is determined by subtracting the amount of stocks in transit to the United States and Europe from the estimated total.
P—Preliminary estimate.

TOTAL WORLD STOCKS

(Figures from the Survey of Current Business)

At end of	1932	1933	1934	1935	1936*	1937
January	623,416*	634,797	661,948	698,153	600,479	454,249*
February	611,819*	626,227	663,308	686,195	599,355	445,265*
March	614,894*	638,428	666,382	678,809	583,318	447,856*
April	615,893*	629,159	653,796	677,006	567,172	428,249*
May	612,474*	626,537	689,239	677,569	541,871	413,134*
June	595,712	613,055	672,804	671,525	520,255	433,257*
July	589,037	618,258	676,200	679,061	519,074	445,782
August	597,274	617,449	674,702	680,644	500,520	457,462
September	599,986	623,683	694,361	661,509	493,585	470,768*
October	609,368	636,597	680,616	655,000	486,159	479,398*
November	614,342	642,968	684,408	617,300*	466,491	492,266
December	629,898	654,890	705,975	613,987*	466,576	.....
Monthly Avge.	609,502*	630,171	677,395	666,397*	528,738	.....

* Revised.

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

PRODUCTION FIGURES ON QUARTERLY BASIS

Quarter	1930	1931	1932	1933	1934	1935	1936	1937
Jan.-Mar.	13,903	12,323	11,004	6,635	13,437	13,355	11,798	16,142
Apr.-June	16,487	16,295	12,980	14,412	13,565	12,597	15,443	16,421
July-Sept.	11,522	12,004	9,245	14,707	9,822	11,312	15,467	12,653
Oct.-Dec.	9,050	8,117	6,856	9,550	10,406	12,099	15,409	.....
Total	50,962	48,739	40,085	45,304	47,230	49,363	58,117	.....

SHIPMENT FIGURES ON QUARTERLY BASIS

Quarter	1930	1931	1932	1933	1934	1935	1936	1937
Jan.-Mar.	13,318	11,268	8,760	6,981	10,730	11,154	10,944	14,667
Apr.-June	15,599	15,919	18,021	15,139	14,998	13,473	16,530	16,324
July-Sept.	15,027	14,354	8,141	13,707	11,648	13,489	14,558	13,591
Oct.-Dec.	9,694	8,510	5,329	8,265	9,310	12,066	13,331	.....
Total	53,638	50,051	40,251	44,092	46,686	50,182	55,363	.....

INVENTORY FIGURES[2]

Quarter	1930	1931	1932	1933	1934	1935	1936	1937
Jan.-Mar.	12,513	10,014	9,878	7,290	11,651	11,675	9,087	12,488
Apr.-June	13,277	10,447	4,999	6,615	10,219	10,755	7,835	12,529
July-Sept.	9,812	8,158	6,096	7,595	8,419	8,288	9,012	11,615
Oct.-Dec.	9,003	7,775	7,644	8,888	9,455	8,196	11,114	.....

AUTOMOBILE INNER TUBES

PRODUCTION FIGURES ON QUARTERLY BASIS

Quarter	1930	1931	1932	1933	1934	1935	1936	1937
Jan.-Mar.	14,182	11,989	10,721	6,230	12,823	12,553	11,935	15,715
Apr.-June	15,995	15,388	11,913	13,001	13,191	11,631	14,678	15,299
July-Sept.	12,552	12,839	8,286	14,356	10,321	11,270	15,377	.....
Oct.-Dec.	9,691	8,117	5,970	9,000	9,891	12,425	15,257	.....
Total	52,420	48,333	36,890	42,587	46,226	47,879	57,247	.....

SHIPMENT FIGURES ON QUARTERLY BASIS

Quarter	1930	1931	1932	1933	1934	1935	1936	1937
Jan.-Mar.	13,921	11,251	8,918	6,539	10,640	11,252	11,410	14,497
Apr.-June	15,187	15,314	16,271	13,292	14,553	11,928	15,169	15,380
July-Sept.	16,158	15,282	7,761	13,370	11,545	13,251	15,125	.....
Oct.-Dec.	9,672	8,174	4,961	8,189	8,306	11,636	12,921	.....
Total	54,938	50,021	37,911	41,390	45,044	48,067	54,625	.....

INVENTORY FIGURES[2]

Quarter	1930	1931	1932	1933	1934	1935	1936	1937
Jan.-Mar.	13,179	10,475	9,448	6,369	10,244	10,406	8,692	11,904
Apr.-June	13,612	10,504	5,174	6,097	8,795	10,050	8,105	11,746
July-Sept.	10,065	8,095	5,753	7,008	7,639	7,565	8,627	.....
Oct.-Dec.	9,999	7,922	6,749	7,815	9,180	8,231	10,985	.....

[1] Based on reports received from the Rubber Manufacturers Association. All figures adjusted to 100%.
[2] Held by manufacturers at end of period indicated.

Note: Monthly figures have been discontinued by the R. M. A. since August, 1937. Quarterly figures will continue to be made available, but for casings only.

Automobile Production

	United States Total	United States Passenger Cars	United States Trucks	Canada Total	Canada Passenger Cars	Canada Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934*	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935*	3,946,934	3,252,244	694,690	172,877	135,562	37,315	4,119,811
1936*	4,454,115	3,669,528	784,587	162,159	128,369	33,790	4,616,274
1937							
Jan.*	380,051	309,637	70,414	19,583	14,697*	4,886*	399,634
Feb.*	363,991	296,636	67,355	19,707	14,173*	5,534*	383,698
Mar.*	494,276	403,879	90,397	24,901*	19,127*	5,774*	519,177
Apr.	536,334	439,980	96,354	17,081	12,927	4,154	553,415
May	516,899	425,432	91,467	23,458	17,980	5,478	540,357
June	497,298	411,394	85,904	23,841	17,919	5,922	521,139
July*	438,968	360,403	78,565	17,941	12,513	5,428	456,909
Aug.	394,322	311,456	82,866	10,742	5,814	4,928	405,064
Sept.	171,203	118,671	52,532	4,417	1,926	2,491	175,620
Oct.	329,876	298,662	31,214	8,103	7,378	725	337,979
Nov.	360,063	295,328	64,735	16,574	13,793	2,781	376,637

* Revised.
Note: U. S. figures represent factory sales; Canadian figures represent production.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA [1]								DUTCH EAST INDIES [4]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon [2]	India & Burma [3]	Sarawak [4]	British North Borneo [3]	Siam [4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China [3]	Amazon Valley	All Other [4]	World Total [5]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	37,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,737	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,294	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1934	677,361	211,803	465,558	79,746	10,492	17,233	11,103	17,545	87,400	112,038	175,470	20,170	8,903	2,985	1,008,663
1935	590,319	174,652	415,667	54,316	13,968	19,465	8,885	28,327	57,488	78,325	139,297	28,816	11,275	8,745	864,574
1936	520,286	167,799	352,487	49,692	14,724	21,243	8,177	33,702	61,307	84,577	152,205	40,782	14,193	11,466	845,431
1936:															
Mar.	46,552	12,026	34,526	4,336	1,324	1,848	342	2,966	4,484	5,052	9,225	2,553	1,264	751	68,671
Apr.	36,251	14,702	21,549	3,172	1,230	2,053	869	1,596	4,895	6,446	13,032	2,416	1,056	947	59,261
May	46,568	12,527	34,041	2,560	1,117	2,354	517	2,077	4,258	6,015	10,766	2,281	956	776	67,718
June	40,049	15,026	25,023	3,766	1,226	1,386	461	3,737	4,577	6,519	14,588	2,733	917	823	65,756
July	53,114	19,038	34,076	3,773	1,359	1,399	1,035	3,734	6,133	8,578	17,946	2,738	964	933	82,668
Aug.	43,506	13,361	30,145	3,940	776	2,541	656	3,284	4,978	7,353	12,106	3,017	542	1,054	70,392
Sept.	44,110	10,039	34,071	5,367	664	1,139	537	3,259	4,531	6,241	10,175	3,505	1,119	937	71,545
Oct.	46,543	12,960	33,583	5,599	1,181	2,143	1,086	3,349	6,477	8,145	12,881	3,874	1,255	1,105	80,678
Nov.	47,342	16,923	30,419	4,960	1,322	1,950	701	2,260	5,398	7,109	16,718	3,872	1,592	1,163	77,464
Dec.	38,714	9,758	28,956	4,377	1,844		506	2,988	6,472	10,129	9,536	8,450	1,721	1,087	76,072
1937:															
Jan.	41,571	16,956	24,615	4,541	1,077	4,063	1,234	3,849	5,136	8,011	13,102	2,828	1,271	1,000*	70,727
Feb.	38,058	14,048	24,010	5,619	1,831	2,043	790	3,554	5,484	7,656	12,414	3,074	1,692	1,000*	69,167
Mar.	59,568	19,579	39,989	7,066	2,040	1,425	1,239	3,873	7,791	11,848	19,969	3,173	1,749	1,000*	101,162
Apr.	58,718	17,136	41,582	3,423	1,203	2,960	783	1,899	6,999	8,967	15,989	2,094	1,522	1,000*	88,421
May	51,152	17,350	33,802	4,612	1,012	742	778	2,238	7,530	8,981	21,085	2,887	1,063	1,000*	85,730
June	54,809	23,614	31,195	5,180	1,100	1,890	813	2,933	8,269	12,467	25,225	3,669	762	1,000*	94,503
July	72,704	26,100	46,604	6,285	976	2,543	1,414	3,195	7,512	11,610	23,913	5,563	854	1,000*	111,469
Aug.	64,525	21,398	43,127	7,336	605	1,624	1,189	2,999	6,785	11,635	21,054	2,272	1,248	1,000*	100,874
Sept.	67,414	19,065	48,349	5,771	1,092	2,659	969	3,173	6,402	10,882	19,371	4,128	1,007	1,000*	104,803
Oct.	59,319	11,858	47,461	6,702	1,178	523	1,505	2,352	7,773	12,322	14,285	3,751	1,434	1,000*	100,286
Nov.	57,850	12,396	45,454	4,337	2,128	2,517	1,327	2,414	6,310	10,003	11,596	4,556	1,100	1,000*	92,742
Dec.	56,791														

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 1,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. * Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(*Long Tons*)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880	37,572	9,978	7,593	4,068	11,878	8,140	11,245	895,727
1936	475,359	—2,591	57,032	71,794	27,871	61,223	17,000*	30,967	14,109	9,648	2,888	11,236	6,668	8,772	791,976
1936:															
Aug.	41,094	—1,581	4,513	6,556	3,781	4,305	1,500*	3,128	807	789	42	1,145	500*	989	67,446
Sept.	49,483	—12	4,393	6,006	2,393	5,195	1,500*	2,922	2,297	514	471	1,090	300*	624	77,176
Oct.	40,301	—87	4,752	7,232	3,110	6,600	1,500*	2,761	1,092	817	343	1,171	200*	1,026	70,818
Nov.	37,897	—742	3,282	6,500	4,308	3,961	1,500*	2,162	964	1,090	445	1,388	200*	823	63,778
Dec.	50,838	—4,926	4,688	7,458	1,193	8,698	1,500*	3,426	1,184	759	276	1,206	200*	1,701	78,201
1937:															
Jan.	42,655	33	4,430	7,041	1,632	8,357	1,700	2,633	582	854	269	1,115	200*	567	72,368
Feb.	44,398	—222	5,296	7,911	1,271	6,630	1,502	3,048	304	1,363	245	452	200*	837	73,233
Mar.	39,888	343	5,347	7,668	2,612	6,935	2,119	3,598	1,293	1,641	371	709	200*	601	72,727
Apr.	42,066	3,808	5,291	8,664	1,343	5,837	1,669	1,532	1,058	1,069	362	1,070	200*	1,445	80,414
May	48,506	6,100	5,558	6,706	4,187	8,596	2,772	1,886	1,290	2,113	361	1,576	200*	925	90,776
June	48,972	5,157	6,010	6,469	3,791	7,608	1,958	3,940	2,226	1,630	521	1,802	200*	1,150	91,434
July	43,018	10,628	4,306	7,860	1,946	4,851	2,719	2,150	1,902	851	497	1,409	200*	753	83,090
Sept.	56,685	15,671	4,820	10,595	2,396	3,666	1,941	1,226	3,184	1,258	337	1,648	200*	1,369	104,996
Oct.	52,926	11,899	4,278	8,076	5,998	2,059	939	1,391	2,470	967	367	1,535	200*	988	94,093
Nov.	54,135	12,878							1,935		313				

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

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